United States Environmental Protection Agency

Office of Research and Development

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EPA Technology Transfer HIGHLIGHTS

The following technology transfer products were developed by the National Risk Management Research Laboratory's Center for Environmental Research Information (CERI) over the past year. These products are available and can be obtained from CERI using the form on page 13 or visiting our home page at: http://www.epa.gov/ttbnrmrl/.

Manuals

Constructed Wetlands Treatment of Municipal Wastewaters (EPA/625/R-99/010)

This new manual is an engineering evaluation of constructed wetlands as systems for treatment of primary or lagoon-treated municipal wastewaters to meet secondary or advanced secondary effluent standards. It applies environmental engineering principles to the documented experiences of controlled pilot studies to produce a reference which can be used by engineers and small communities to meet effluent standards set through the discharge permitting processes. It discusses the commonly held biological myths that have characterized the constructed wetland literature to date, and replaces them by application of the known environmental engineering principles of physical, chemical and biological treatment mechanisms. It also offers some historical basis of how those myths were transported from other scientific fields.

This first comprehensive environmental engineering analysis of constructed wetlands as treatment devices is prepared in practical engineering terms for use by design engineers, prospective facility owners, regulators, and planners. The manual allows them to evaluate and compare these systems to other systems of treatment in order to assure that the technology is properly applied on the basis of its capabilities and characteristic properties.

The manual will also provide information on the fate of pollutants, key construction and startup issues, case studies and cost information on several existing constructed wetland treatment systems. The engineering principles approach assists the reader in understanding what constructed wetlands can realistically be expected to accomplish regarding removal of specific and classes of pollutants when treating municipal wastewaters. Armed with such information, complete treatment trains may be conceived and evaluated in concert with other alternative approaches. There is also recognition of the inherent aesthetic values which the public associates with natural treatment systems, which goes beyond the traditional engineering evaluation of alternatives. This recognition gives an intrinsic value to these systems which does not exist for many alternative approaches, even when they are more effective in removal of pollutants. Therefore, social values may enter into the choice of the treatment system, even at some additional cost to the community.

This manual should be a valuable addition to the library and ready reference books of any wastewater practitioner or planner dealing with small community wastewater problems.

Ozone Monitoring, Mapping, and Public Outreach: Delivering Real-Time Ozone Information to Your Community (EPA/625/R-99/007) (EPA/625/C-99/002 CD-ROM)

The EMPACT Program is an EPA program to provide timely environmental information to communities across the nation. The manual may be used by communities and states as a tool to plan, design and implement an ozone monitoring network; a real-time (or time relevant) data acquisition and delivery system, and an ozone mapping software package. The ozone mapping package generates static and animated maps similar to the weather maps used on television. The manual also provides guidance to risk communicators and the public as to the health impacts associated with elevated ozone levels and what actions may be taken to minimize those impacts. An interactive CD-ROM of the manual has been prepared which will allow the user (via hyperlinks) to instantly access any desired section of the manual. The CD-ROM contains direct links to existing EPA and EMPACT websites. A complete version of the manual is available in *.pdf format on the EPA website: http://www.epa.gov/airnow.

ATTENTION

The URL for the Technology Transfer Highlights homepage is: http://www.epa.gov/ttbnrmrl. Visit us on a regular basis to keep updated on new products available from CERI

The Center for Environmental Research Information
The Bridge Between Research and Implementation

Onsite Wastewater Management Design Manual (EPA/625/R-00/008)

Twenty-five percent of the houses in the USA are served by onsite wastewater systems and an even greater percent of new housing is to be served by these systems. Those facts, combined with EPA's recognition of the positive role of decentralized systems in its Report to Congress (EPA 832-R-97/001b), make the newly updated Onsite Manual a major Agency product which has been incorporated into the Clean Water Action Plan (CWAP) issued by USEPA and USDA.

This comprehensive reference manual is designed to provide state and local governments with guidance on the planning, design and oversight of onsite systems. This manual will also be useful for onsite wastewater professionals, developers, land planners, and academics.

Environmental Planning for Communities; A Guide to the Environmental Visioning Process Using a Geographic Information System (GIS) (EPA/625/R-98/003)

This document emphasizes the local stakeholder's role in addressing community-wide environmental issues, especially with respect to the preferred 'green' community development. The document is intended to help communities make decisions about alternative land uses and landscape futures. It examines the issues involved in the use of a Geographic Information System (GIS) to enable and enhance this process.

The document is intended to empower community members to make environmentally sound decisions about future programs and community planning toward sustainable growth and development. It contains a brief description of the Community Based Environmental Protection approach to planning. It also describes some of the available tools for environmental visioning.

Technical Capsule Reports

In-Situ Treatment of Groundwater Contaminated with Chromium (EPA/625/R-00/005)

Chromium contamination of soils and groundwater is a persistent and widespread problem. Removal and/or reduction of heavy metals presents a great challenge to risk managers and decision makers attempting to reduce the risk of metal contamination to human health and the environment. In the past, many decision makers and stakeholders have lacked the resources and expertise to remediate these sites in a timely and cost effective manner, but commercial vendors and remediation firms have developed new and innovative ways for dealing with this problem. Potential remedial options include: permeable reactive barriers, reactive zones, electrokinetics, geochemical fixation, soil flushing, bioremediation and abiotic natural attenuation, to name a few.

A technology transfer resource guide will be available for distribution in the fall of calendar year 2000 including results generated from treatability studies, case studies, field demonstration projects, and commercial applications. There will also be an extensive literature review on the science of technology applications as well as a comprehensive bibliography.

Handbooks

Development and Implementation of a Lead-Contaminated Soil Monitoring, Assessment and Outreach Program for Residential Communities under the EMPACT Program (EPA/625/R-00/012)

A technology transfer handbook (in print and CD ROM formats) is being completed on how to plan and implement a soil-lead monitoring, assessment, mitigation and outreach program for residential communities. The handbook will provide guidance on 1) identifying potentially impacted communities, 2) community outreach and education, 3) preparing sampling, analysis and quality assurance plans, 4) soil mitigation strategies, and 5) developing and maintaining a data management and delivery system.

The technology transfer handbook will showcase the lead monitoring, mitigation and outreach programs developed for the EPA EMPACT (Environmental Monitoring for Public Access and Community Tracking) Lead Safe Yard Project. The Lead Safe Yard Project, originally piloted in the Dorchester, Massachusetts area, assists low-income inner city families by providing education, soil lead data, interpretation and assistance in application of low-cost soil intervention and risk reduction measures. This project was conceived as a primary intervention effort to reduce the risk of lead poisoning to children playing in lead- contaminated inner city yards.

Under the Lead Safe Yard Project, hazard reduction is achieved by advising the resident on appropriate changes to yard usage patterns and by offering simple low-cost landscaping treatments that reduce exposure to lead-contaminated soils. This type of project has wide application to residential properties nationwide by offering easy-to-employ and cost-effective residential soil lead monitoring and exposure reduction guidance that can be implemented by homeowners, residents, and community and environmental organizations with minimal resources.

The technology transfer handbook will summarize each of the Lead Safe Yard Project elements and provide a compilation of success stories and lessons-learned from the project. Highlights from other related residential soil lead monitoring and outreach programs will also be provided.

Delivering Time-Relevant Water Quality Information to Your Community; The Lake Access-Minneapolis Project (EPA/625/R-00/013)

A technology transfer handbook (in print and CD ROM formats) on how to plan and implement a real-time water quality monitoring, assessment, data visualization and outreach program for residential communities. The handbook will provide guidance on 1) water quality monitoring, 2) collecting, transferring and managing time-relevant water quality data, 3) depicting time-relevant water quality data, 4) communication time-relevant water quality information, and 5) appendices for technical information.

The technology transfer handbook will showcase the water quality monitoring, data visualization tools and outreach programs developed for the EPA EMPACT (Environmental Monitoring for Public Access and Community Tracking) Lake Access Project. The Lake Access Project, originally piloted in the Minneapolis, Minnesota area, assists water quality management by providing education, water quality data, interpretation and assistance in application of low-cost intervention and risk reduction measures. This project was conceived as a primary educational and intervention effort to reduce the risk of further eutrophication in suburban lakes.

Seminar Publications

Proceedings: National Conference on Tools for Urban Water Resource Management & Protection (EPA/625/R-00/001) (EPA/625/C-00/001 CD-ROM)

This national conference, co-sponsored by EPA, the Chicago Botanic Garden, and the Northeastern Illinois Planning Commission, was held February 7-10, 2000, in Chicago. A wide array of effective water quality management and protection tools have been developed for urban environments, but implementation has been hindered by a shortage of technology transfer opportunities. This conference was designed to facilitate the transfer of state-of-the-art information to state, regional, and local urban water quality practitioners. A major focus of the conference was to provide practical information on the most effective tools and technologies for meeting new NPDES Phase II permit requirements. Program topics were chosen to reflect the Phase II Program's six priorities, including public education, public involvement, detection and elimination of illicit discharges, construction site runoff control, post-construction stormwater management, and pollution prevention for municipal operations. The proceedings include 46 peer-reviewed papers delivered at the conference.

Abiotic In-Situ Groundwater Remediation Proceedings Document (EPA/625/R-99/012)

The development of cost effective in-situ treatment technologies has been a major priority of research and outreach for the EPA's Office of Research and Development and the National Risk Management Research Laboratory (NRMRL). A number of field demonstrations, bench studies and technology evaluations are being conducted by NRMRL and others to promote the application of innovative technologies for the remediation of contaminated groundwater. Aggressive treatment technologies and passive containment technologies are being investigated for use in cleaning up contaminated groundwater. A conference was convened in late summer of 1999 in Dallas, TX to assist remedial project managers; on-scene coordinators; state, local, and tribal decision makers; and vendors in evaluating remedial options and current practices. Some of the technology applications and topical areas presented were: permeable reactive barriers for organic/inorganic treatment, reactive zones (chemical amendments), hydraulic containment, in-situ flushing, thermal enhancement, electrokinetics, capture zone modeling, in-situ treatment of DNAPLs, fate and transport and monitoring and assessment. This proceedings document should be available by early fall of calendar year 2000.

Summary VOC Recovery Seminar Proceedings Report and Videotape (EPA/625/R-99/005)

A summary report and videotape was prepared for the VOC (Volatile Organic Compounds) Recovery Seminar held in Cincinnati, OH. The seminar focused on the following key issues:

- Status and future direction of EPA, DOE, and other major research programs
- The latest technology innovations in VOC treatment and recovery
- Performance and cost effectiveness of VOC recovery techniques
- VOC recovery techniques applied to air, water, and solid wastes

Presenters from industry, academia, EPA, and various consulting firms were followed by facilitated breakout sessions that allowed participants to discuss their needs and opinions on VOC recovery trends, research, and other issues. The report contains summaries of the presentations and discussions. The videotape contains edited highlights of each of these presentations.

Engineering Trade-Offs CD-ROM (EPA/625/C-00/002)

NRMRL's Engineering Trade-Offs (ETO) program is developing a methodological approach that integrates economic impacts (cost and performance) with environmental impacts of a decision, including implementation and social reaction. ETO focuses on four areas: performance, environment, economics and acceptance. These are considered critical because a failure in any one area ultimately defeats the goal of the decision. For example, if a change of technology has demonstrated lower costs, better performance and lower environmental effects, the benefits can be negated if those responsible for implementation of the technology do not understand it or resist using it. ETO seeks to develop a methodological approach to capture the potential for success and the risk of failure in each of these areas to guide the decision-maker in the successful implementation of source reduction activities and technologies. ETO is for those individuals needing to make public and corporate decisions who may not possess the staff or resources for more sophisticated life cycle-based analyses. It is being developed as a method to compare two or more products, processes or activities, as opposed to design approaches to improve an existing activity. Currently, NRMRL has developed the concept for ETO and is in the midst of developing a practical methodology.

Summary Reports

Workshop on Source Emission and Ambient Air Monitoring of Mercury, September 13-14, 1999, Bloomington, MN (EPA/625/R-00/002)

A workshop on Source Emission and Ambient Air Monitoring of Mercury was held on September 13-14, 1999, in Bloomington, MN. The workshop was sponsored by the U.S. Environmental Protection Agency's (EPA's) Office of Research and Development (ORD), and was conducted in collaboration with the Air and Waste Management Association (AWMA) International Specialty Conference on Mercury in the Environment. The purpose of the workshop was to discuss the state-of-the-science in source and ambient air mercury monitoring as well as mercury monitoring research and development needs. The workshop was open to the public and included traditional presentations as well as interactive discussions on key research questions.

This workshop report provides a summary of: 1) the state-of-the-science in source emission and ambient air mercury monitoring; 2) key issues, findings, and results from the workshop, including the need for developing total and speciated mercury Continuous Emission Monitors (CEMs); 3) policy, technical considerations, and challenges associated with implementing mercury CEMs, 4) need for monitoring data to support the development of source/receptor relationships, modeling, and risk assessment, and 5) recommendations by the EPA Workshop Steering Committee for future mercury monitoring research, performance evaluations, and testing. Appendix A provides the agenda and synopses of presentations and panel discussions from the workshop; Appendix B provides a list of workshop participants and contact information.

The intended audience for this summary report includes: the management and staff of EPA ORD and EPA Regions and Program Offices (particularly, the Office of Solid Waste and the Office of Air Quality Planning and Standards), the Department of Energy and other federal agencies, state and regional air regulators and scientists, the national and international mercury research community, developers of mercury monitoring instrumentation, and industry (i.e., representatives from the waste incineration and coal-fired electric utility industries).

Report of the December 15, 1999 EPA Satellite Forum on Ozone Monitoring, Mapping and Public Outreach (EPA/625/R-00/003)

This report provides a summary of the U.S. EPA's December 15, 1999 satellite forum on technology transfer tools for ozone monitoring, mapping, and public outreach. This forum was conducted under the EPA Environmental Monitoring for Public Access and Community Tracking (EMPACT) Program's Ozone Mapping Project (referred to as AirNow). EPA created the EMPACT program in 1997 to provide timely environmental information to communities across the nation.

The purpose of AirNow is to provide the public with real-time information about ozone pollution in an easy-to-understand pictorial format. AirNow is a collaborative effort among EPA, state and local air quality agencies, and regional organizations to collect, quality assure and transfer real-time air quality information to the public.

The satellite forum was convened by EPA's Office of Air Quality Planning and Standards and Office of Research and Development in conjunction with the EMPACT program. Participants in the satellite forum included representatives of EPA and state and local air agencies. Topics included: the EMPACT program; major components of AirNow's program to design, implement, and operate an ozone monitoring network, an automated data transfer system, an ozone mapping system, conducting public outreach; the technology transfer handbook and CD ROM entitled: *Ozone Monitoring, Mapping, and Public Outreach: Delivering Real-Time Ozone Information to Your Community* (EPA/625/R-99/007, EPA/625/C-99/002 CD-ROM).

Assessing and Managing Mercury From Historic and Current Mining Activities, November 28-30, 2000, Cathedral Hill Hotel, San Francisco, CA

This conference is being designed to achieve three primary goals:

- Convey public, non-profit and private sector perspectives on the assessment and management of mercury associated with mining processes, residuals and environmental impacts;
- Present past, present, and future efforts that address mercury production, contaminant reduction, and site remediation resulting from mining and waste disposal practices; and
- Identify data gaps and information needs to improve mercury risk assessment and management resulting from mining and environmental restoration activities.

Papers and panel discussions will be presented by national and international experts on a wide variety of mercury in mining topics including, air emissions and impacts, past and present mining operations, source characterization, monitoring, fate and transport, watershed impairment, management and remediation options, risk assessment, and global issues.

Engineers, scientists, regulatory personnel, and public and private sector decision-makers interested in issues associated with the assessment and management of mercury are encouraged to attend this conference.

International Pollution Prevention Summit and Fall National Pollution Prevention Roundtable Workgroup Meeting, October 18-20, 2000 in Montreal, Quebec, Canada

The first International Pollution Prevention Summit will be held in Montreal, Quebec, Canada, October 18-20, 2000. This conference will be the first meeting of pollution prevention (P2) representatives from the P2 Roundtables and Cleaner Production Centres from around the world. Leading practitioners will join together to develop partnerships and stimulate further action on P2. Additionally, there will be information and technical sharing of the latest P2 research and innovations. The gathering provides a unique opportunity to bring together P2 experts at all levels of government (federal, state, and local) as well as those from non-governmental organizations and industry.

Immediately prior to the International P2 Summit, the National Pollution Prevention Roundtable will hold its Fall Workgroup Conference at the same location. This meeting focuses on activities relevant to objectives and goals of the seven workgroups and five discussion groups. These groups meet annually to share projects and products related to areas of interest and to begin planning for the NPPR's larger Spring conference (see below).

The Technology Transfer Branch is represented on the Steering Committee for these meetings and is actively involved in promoting and supporting these pollution prevention conferences. More information concerning these meetings can be obtained from the NPPR website: http://www.p2.org.

Spring 2001 Annual National Pollution Prevention Roundtable, February 28-March 2, 2001 in Chicago, IL

The National Pollution Prevention Roundtable (NPPR) will hold its annual Spring conference in Chicago, February 28-March 2, 2001. The Technology Transfer Branch is joining with Region 5 to help sponsor this showcase of pollution prevention information and networking. This conference continues to be the only one of its depth and breadth in the United States. Its membership includes the largest network of P2 advocates, managers, and practitioners representing federal, state, local and tribal government programs, industry, the public interest community, universities, and environmental consultants from all over the country and the world. This meeting provides an unparalleled opportunity for technical training and information exchange. The sessions, expected to draw over 700 participants, feature tracks in sustainable development; technology and research innovations; P2 information technology; regulatory integration; technical assistance and outreach; policy; ISO 14000; education, training and learning; local government; facility planning; measurement; evaluation; small business outreach; and energy efficiency. Further information will be published on the NPPR website at http://www.p2.org.

Sustainable Development Workshop
Cincinnati, OH
June 20-22, 2000

The National Risk Management Research Laboratory (NRMRL) held a workshop on research issues in the area of Strategy for Sustainability in Cincinnati on June 20-22, 2000. The participants included members of NRMRL, other USEPA Laboratories, Program Offices, the USEPA Regions, academia, and the private sector.

The objectives of the workshop were to identify a set of research needs which could be addressed by the NRMRL in the future, to foster partnerships in such research with others concerned with this area of effort, and to nurture cooperation and communication among researchers in this area. Participants were asked to consider several significant issues involved with human health and well-being as well as with ecological health.

About 65 participants worked for two and one-half days to meet these objectives. The information gathered in this workshop will be integral to the development of a NRMRL Sustainable Development Research Proposal.

Workshop on Risk Communication as a Risk Management Tool
Vernon Manor Hotel, Cincinnati OH
August 16-17, 2000

The Technology Transfer Branch of the National Risk Management Research Laboratory sponsored an August 16-17 workshop on Risk Communication as a Risk Management Tool. Topics including the basics of risk assessment, risk communication theory, and risk communication principles as illustrated by case studies including Alar, Phthalates and the Brent Spar. Speakers included international experts on the case studies as well as an award-winning newscaster who spoke on the role of mass media in risk communication. A proceedings document will be coming later in the year.

The 93rd Annual Conference of the Air and Waste Management Association
Salt Lake City, UT
June 18-23, 2000

The Air and Waste Management Association (AWMA) conference, which draws a world-wide audience, followed the pattern set by its forerunners by offering over 150 technical sessions with more than 800 peer-reviewed papers covering pollution and waste. Most conferences do not offer 150 technical papers, let alone 150 technical sessions. On the exhibit side, CERI coordinated EPA's involvement which included participation by several labs, program offices, and other EPA groups. EPA is planning its involvement at next year's conference which will take place in Orlando, FL, June 25-27, 2001.

American Water Works Association's National Conference
Denver, CO
June 8-11, 2000

Denver hosted the American Water Works Association's (AWWA) annual conference June 8-11, 2000. Approximately 14,000 individuals attended this conference. The National Risk Management Research Laboratory and the Office of Ground Water and Drinking Water again cooperated in the annual exhibit. EPA technical information products were made available to the attendees and over 500 exhibitors. Next year's AWMA annual conference will be held in Washington, DC, June 17-21, 2001.

New Technology Transfer Products Coming Your Way

Environmental Problem Solving Using Geographic Information Systems (GIS)

The proceedings from two conferences, Environmental Problem Solving Using Geographic Information Systems from1994 and 1999 will be available on CR-ROM in the fall of 2000. The proceedings contain the agendas for both conferences and any paper can be accessed separately in PDF format.

The conferences were international gatherings of approximately 400 participants each. Presentations focused on the aspects of problem formulation, research approach, and the value of using Geographic Information Systems (GIS) to assess, evaluate, and solve environmental problems. The spectrum of papers at each conference was broad and covered a variety of areas of interest, each of which comprised a session. The document will be available on the Internet in the fall of 2000 as well.

A New Vision: An Organizational Guide to Pollution Prevention

The revision of EPA/625/R-92/088, *Facility Pollution Prevention Guide,* is nearing completion. *A New Vision: An Organizational Guide to Pollution Prevention* will be published in the Spring of 2001. It will be accompanied by a CD-ROM that and will provide additional information and instructions for use. This guide takes a new look at pollution prevention (P2), providing lessons learned from the last twelve years and focusing on incorporating P2 into the mainstream operations of any organization. Traditional tools are adapted to provide a logical methodology for accomplishing systematic pollution prevention and environmental improvement. Three popular approaches are examined and compared, with suggestions for combining parts of these to design and personalize any organization's needs. The three approaches are the traditional P2 assessment and worksheet methodology, the ISO 14000 environmental management system approach, and the Green Zia Program in New Mexico. The Green Zia Program is adapted from the Malcolm Baldrige National Quality Award Program and follows a parallel path for environmental excellence. The guide will be available in *.pdf downloadable format from the Technology Transfer Highlights Homepage (http://www.epa.gov/ttbnrmrl), on CD-ROM, or in print.

Innovative Cleanup Approaches: Investments in Technology Development, Results and Outlook for the Future

The US EPA Offices of Research and Development and the Technology Innovation Office jointly sponsored a conference on November 2-4, in Bloomingdale, Illinois to share the most recent information about innovative characterization and remediation of hazardous waste. Through a number of legislative and special initiatives, the US EPA has promoted the development and implementation of a wide range of technologies including treatment options for chlorinated solvents, PCB/Pesticides, optimization of soil vapor extraction, bioavailability of metals sampling techniques, geophysical technologies and workshops on current grant and demonstration programs. The conference was attended by over 550 researchers and technology developers. A proceedings document of 45 papers that were presented at the conference is being prepared for publication later this year.

MTBE Biodegradation Workshop

Methyl *tert*-butyl ether (MTBE) has become the focus of significant attention in recent months due to public focus on several sites where MTBE plumes are impacting drinking water sources. A workshop on bioremediation of MTBE contaminated soils and groundwater was held by the EPA's National Risk Management research Laboratory and the American Petroleum Institute in Cincinnati, Ohio in February, 2000. Researchers in academia, industry and government were invited to attend and present current research. The goals of the workshops were to gain an understanding of the types of MTBE research that various organizations are conducting and conclusions of this research; to identify the remaining research needs on MTBE biodegradability; and to better understand what research is bing planned for the future. A summary of the workshop discussions and speaker presentations will be published in the fall of this year.

Phytoremediation State-of-the Science Conference

Many pollutants in soils are notoriously difficult and expensive to extract or break down. Phytoremediation is the use of green plants to cleanup soil, sediment, and water that has been contaminated with metals and/or organic chemicals such as munitions, solvents and polyaromatic hydrocarbons. Many of the experts in this field participated in a two day conference in Boston in May 2000 to discuss plant biochemistry and biotechnology in the cleanup of hazardous waste sites and the control of industrial effluents. A conference summary report and abstracts of the technical presentations and posters given at the conference will be available later in the year.

Strategy for Research for Environmental Risks to Children (EPA/600/R-00/068)

The EPA's peer reviewed Strategy for Research on Environmental Risks to Children contains extensive discussion and scientific planning for all components of the National Academy of Science Paradigm for Risk Assessment/Risk Management as it may pertain to the special risks for children. All of the national laboratories of EPA's Office of Research and Development have provided major contributions to this effort and a multi-year plan is presented. Of particular interest within the National Risk Management Research Laboratory are discussions of health concerns that may result from children's unique exposure to indoor air as well as their increased susceptibility to infectious diseases like cryptosporidiosis that can be controlled through drinking water treatment technologies. At present this document is being printed and should soon be available to interested individuals as well as other governmental agencies.

ORD to Develop Inventory of Ecological Restoration Projects in the Mid-Atlantic Region

The Office of Research and Development is developing an on-line, interactive inventory of existing ecosystem restoration projects within the Mid-Atlantic Integrated Assessment (MAIA) region. The MAIA region includes all of EPA's Region III (Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia) and portions of New York, New Jersey, and North Carolina.

For each restoration project, the inventory will include a general description of the restoration site, the environmental problem to be addressed, technical approaches, costs, monitoring activities, and contacts for further information. It is being developed primarily to assist researchers, restoration consultants and practitioners, policy makers, and communities. The inventory will complement other EPA ecosystem information sources, such as the *MAIA Inventory of Monitoring Programs* (*http://www.epa.gov/emap/maia/html/maiainv.html*) and the *River Corridors and Wetlands Restoration* web site (*http://www.epa.gov/owow/wetlands/restore/intro.htm*).

Please visit the *Technology Transfer Highlights Homepage* at *http://www.epa.gov/ttbnrmrl* for information about the current status of the Inventory (anticipated mid-FY 2001 implementation) or to contribute information to be included in the Inventory.

Pollution Prevention in Small and Medium Scale Industries

The proliferation of firms that handle hazardous substances or generate toxic wastes, especially in many areas of the developing world like South and Central America, is a growing problem and one that requires increased attention. To assist developing countries in initiating programs for hazardous waste management, CERI cooperated with the Pan American Health Organization's Center for Sanitary Engineering and Environmental Sciences (CEPIS) in Lima, Peru to present industry-specific pollution prevention workshops in several Peruvian industrial centers to over 700 managers.

The goal of these workshops was to provide technical assistance to firms engaged in potentially polluting manufacturing activities and improve process efficiencies, thus reducing costs and enhancing the environment. Issues covered included environmental degradation from industrial waste, the significance of small and medium size industries in pollution prevention efforts, the principles of pollution prevention and resulting cost savings, the application of these principles to specific industries, centralized waste treatment, and case studies. Information developed for and at the workshops was critically reviewed and updated before publication in a bilingual manual.

The manual is divided into two volumes. The first one presents theoretical aspects of waste management, especially in tanneries, wet-end textile operations, electroplating and food processing, where small- and medium-scale industries predominate. The second volume develops application examples; describes a procedure for quickly identifying the major waste streams associated with specific industries; allows identification of potential treatment options; and presents a comprehensive application for the wood lacquering industry. The appendices provide information on screening, characterization and classification of hazardous wastes and effluents and on several methodologies, such as generation indexes.

Printed or CD copies of this two-volume manual are available in English or Spanish from CEPIS. Please contact Irma Sanchez at isanchez@cepis.ops-oms.org.

TECHNOLOGY TRANSFER PRODUCTS

MANUALS

Land Treatment of Municipal Wastewater (Oct. 1981) 625/1-81/013
Supplement for Land Treatment of Municipal Wastewater (Oct. 1984) 625/1-81/013a
Phosphorus Removal 625/1-87/001
Dewatering Municipal Wastewater Sludges (Sept. 1987) 625/1-87/014
Fine Pore Aeration Systems (Oct. 1989) 625/1-89/023
Alternative Collection Systems for Small Communities (Oct. 1991) 625/1-91/024
Guidelines for Water Reuse (Sept. 1992) 625/R-92/004
Wastewater Treatment/Disposal for Small Communities (Sept. 1992) 625/R-92/005
Control of CSO Discharges (Sept. 1993) 625/R-93/007
Alternative Methods for Delivery and Recover (Oct. 1994) 625/R-94/003
Recycling and Reuse of Materials Found on Superfund Sites (Oct. 1994) 625/R-94/004
Ground Water and Leachate Treatment Systems (Jan. 1995) 625/R-94/005
Process Design Manual: Surface Disposal of Sewage Sludge and Domestic Septage 625/R-95/002
Compendiums of Test Methods for the Determination of Toxic Organic Compounds in Ambient Air 625/R-96/010b
SITE: Rochem Separation System's Inc. (ROCHEM) Disc Tube™ Module (DTM)
Innovative Technology Evaluation Report (ITER)` 540/R-96/507
• Environmental Planning for Communities; A Guide to the Environmental Visioning Process Using a Geographic Information System (GIS) 625/R-98/003
• Ozone Monitoring, Mapping, and Public Outreach: Delivering Real-Time Ozone Information to Your Community 625/R-99/007
CD-ROM 625/C-99/002
• Constructed Wetlands Treatment of Municipal Wastewaters 625/R-99/010
• Onsite Wastewater Management Design Manual 625/R-00/008

TECHNICAL CAPSULE REPORTS

Radon-Resistant Construction Techniques for New Residential Construction: Technical Guidance 625/2-91/032
Approaches For Remediation Of Uncontrolled Wood Preserving Sites (Nov. 1990) 625/7-90/011
Treatment Of Metal Finishing Industry Wastewaters: Evaporation Process Capsule Report 625/R-96/008
Treatment Of Metal Finishing Industry Wastewaters: Reverse Osmosis Process Capsule Report 625/R-96/009
Sources and Air Emission Control Technologies at Waste Management Facilities 625/R-97/002
Aqueous Mercury Treatment 625/R-97/004
Hard Chrome Fume Suppressants and Control Technologies 625/R-98/002
• In-Situ Treatment of Groundwater Contaminated with Chromium 625/R-00/005

SEMINAR PUBLICATIONS

Permitting Hazardous Waste Incinerators 625/4-87/017
Transport and Fate of Contaminants in the Subsurface 625/4-89/019
Corrective Actions - Technologies and Applications 625/4-89/020
Solvent Waste Reduction Alternatives 625/4-89/021
Requirements for Hazardous Waste Landfill Design, Construction and Closure 625/4-89/022
Technologies for Upgrading Existing or Designing New Drinking Water Treatment Facilities 625/4-89/023
Risk Assessment, Management and Communication of Drinking Water Contamination 625/4-89/024
Design and Construction of RCRA/CERCLA Final Covers 625/4-91/025
Site Characterization for Subsurface Remediation 625/4-91/026
Control of Biofilm Growth in Drinking Water Distribution Systems 625/R-92/001
Organic Air Emissions from Waste Management Facilities 625/R-92/003

• Listed for first time

TECHNOLOGY TRANSFER PRODUCTS (continued)

The National Rural Clean Water Program Symposium 625/R-92/006
RCRA Corrective Action Stabilization Technologies 625/R-92/014
Wellhead Protection: A Guide for Small Communities 625/R-93/002
Operational Parameters for Hazardous Waste Combustion Devices 625/R-93/008
Design, Operation, and Closure of Municipal Solid Waste Landfills 625/R-94/008
National Conference on Urban Runoff Management 625/R-95/003
National Conference on Environmental Problem Solving with Geographic Information Systems 625/R-95/004
National Conference on Sanitary Sewer Overflows 625/R-96/007
Proceedings of National Conference on Management and Treatment of Contaminated Sediments 625/R-98/001
• Proceedings: Retrofit Opportunities for Water Resource Protection in Urban Environments 625/R-99/002
CD-ROM 625/C-99/001
• Summary VOC Recovery Seminar Proceedings Report and Videotape 625/R-99/005
• Abiotic In-Situ Groundwater Remediation Proceedings Document 625/R-99/012
• Proceedings: National Conference on Tools for Urban Water Resource Management & Protection 625/R-00/001
CD-ROM 625/C-00/001
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