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October-December 1991

United States
Environmental Protection
Agency

Office of
Administration
Washington, D.C. 20460

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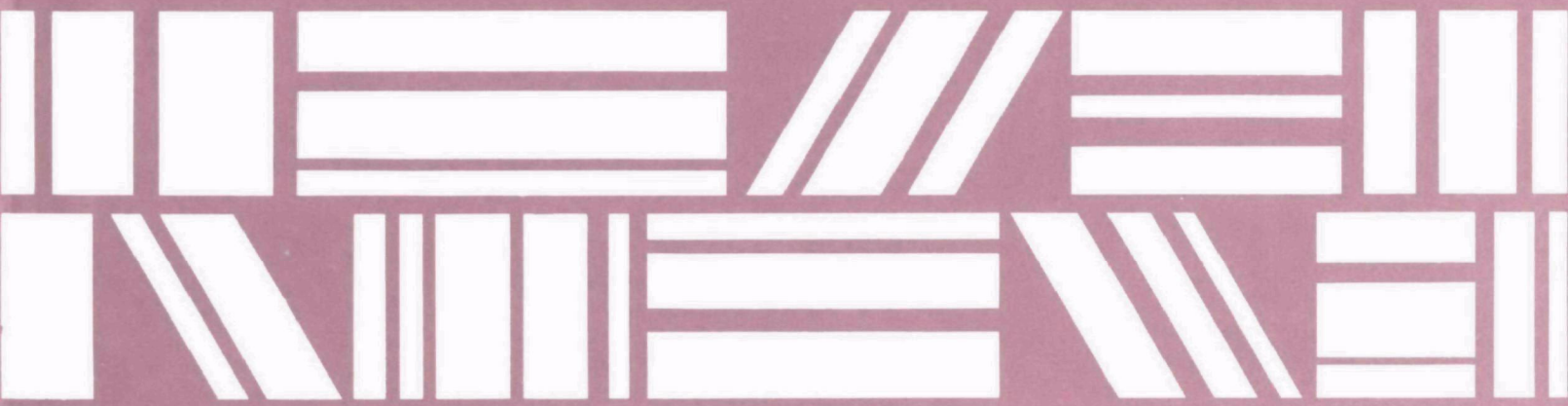
EPA

EPA Publications Bibliography

Quarterly Abstract Bulletin



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EPA PUBLICATIONS BIBLIOGRAPHY

QUARTERLY ABSTRACT BULLETIN

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FOREWORD

The **EPA Cumulative Bibliography,** 1970-1976, published in December 1976 (order number PB-265920, price code E99) contains bibliographic citations with abstract for reports generated by EPA and its predecessor agencies and entered into the NTIS collection through 1976. Access points to this cumulative are by Report Title; Subject (keyword); Corporate or Personal Author; Contract Number; and Accession/Report Number.

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USERS' GUIDE

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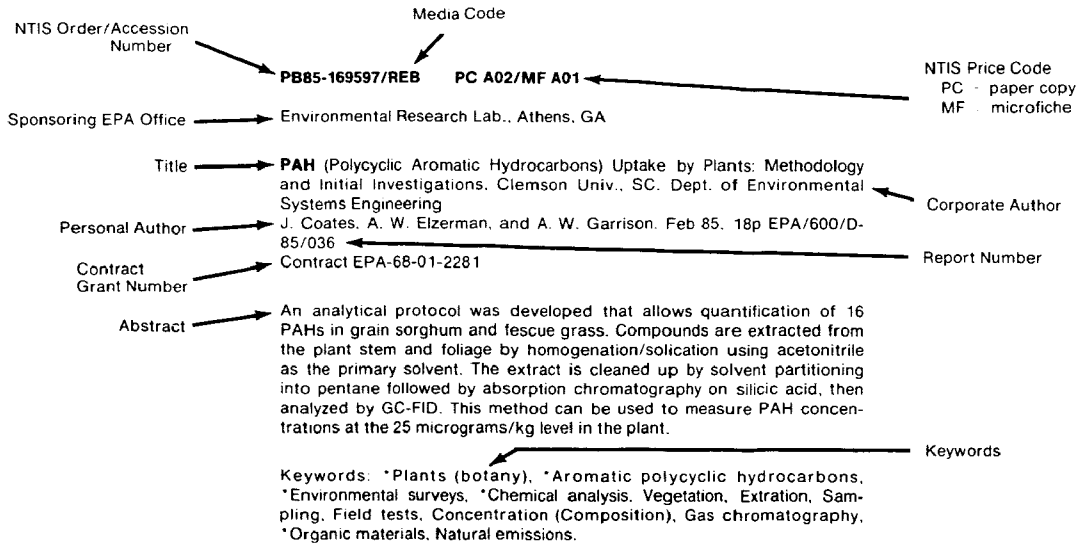

Index entries are arranged alphanumerically. Titles are included in all indexes except Contract/Grant Number Index. Sample entries for each index follow:

Title: Reports are listed alphabetically by title; **A, An,** and **The** at the beginning of a title are ignored in alphabetizing.	**PAH (Polycyclic Aromatic Hydrocarbons)** Uptake by Plants: Methodology and Initial Investigations **PB85-169597/REB PC** A02/**MF** A01
Keyword: Entries are sequenced by major subject term, second paired term, and NTIS order number.	**Plants (Botany)** PAH (Polycyclic Aromatic Hydrocarbons) Uptake by Plants: Methodology and Initial Investigations **PB85-169597/REB PC** A02/**MF** A01
Sponsoring EPA Office: Publications are sorted alphabetically by title under the sponsoring EPA office. The EPA office is listed alphabetically beginning with the major EPA Headquarters Office. Laboratories and Divisions are listed alphabetically within the appropriate office.	**Environmental Research Lab., Athens, GA** EPA/600/D-85/036 PAH (Polycyclic Aromatic Hydrocarbons) Uptake by Plants: Methodology and Initial Investigations **PB85-169597/REB PC** A02/**MF** A01
Corporate Author: Entries are sequenced by corporate author name, report number, and NTIS order number. The monitor agency number is given following the report title.	**Clemson Univ., SC, Dept.of Environmental Systems Engineering** EPA/600/D-85/036 PAH (Polycyclic Aromatic Hydrocarbons) Uptake by Plants: Methodology and Initial Investigations EPA/600/D-85/036 **PB85-169597/REB PC** A02/**MF** A01
Personal Author: Entries are sequenced by personal author, report title, and NTIS order number.	**J. Coates, A. W. Elzerman and A. W. Garrison** PAH (Polycyclic Aromatic Hydrocarbons) Uptake by Plants: Methodology **PB85-169597/REB PC** A02/**MF** A01
Contract/Grant Number: Entries are sequenced by contract or grant number, corporate author, and NTIS order number.	**EPA-68-01-2281** Clemson Univ., SC, Dept. of Environmental Systems Engineering **PB85-169597/REB PC** A02/**MF** A01
NTIS Order/Report Number: Entries are sequenced by NTIS order, report, or monitor agency number.	**EPA/600/D-85/036** PAH (Polycyclic Aromatic Hydrocarbons) Uptake by Plants: Methodology **PB85-169597/REB PC** A02/**MF** A01

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Quarterly Abstract Bulletin

The full bibliographic report entries in this section are arranged alphanumerically by NTIS order number. Alphabetic data precedes numeric.

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SAMPLE ENTRY

NTIS Order Number/Media Code Price Codes	**PB85-169597/REB PC A02/MF A01**
Report Title	PAH (Poly Cyclic Aromatic Hyrdocarbons) Uptake by Plants: Methodology and Initial Investigations
Corporate Author	Clemson Univ., SC. Dept. of Environmental Systems Engineering
Personal Authors	COATHES J., ELZERMAN A. W. and GARRISON A. W.
Date	February 85
Pages	18p
Report Number	EPA/600/D-85/036
Contract Number	EPA-68-01-2281
Abstract	An analytical protocol was developed that allows quantification of 16 PAHs in grain sorghum and fescue grass. Compounds are extracted from the plant stem and foliage by homogenation/solication using acetonitrile as the primary solvent. The extract is cleaned up by solvent partitioning into pentane followed by absorption chromatography on silicic acid, then analyzed by GC-FID. This method can be used to measure PAH concentrations at the 25 micrograms/kg level in the plant.
Keywords (Descriptors & Identifiers)	*Plants (botany, *Aromatic polycyclic hydrocarbons, Environmental surveys, *Chemical analysis, Vegetation, Extration, Sampling, Field tests, Concentration (Composition), Gas chromatography, *Organic materials, Natural emissions.

EPA PUBLICATIONS BIBLIOGRAPHY
Quarterly Abstract Bulletin

PB91-151563/REB PC$18.00/MF **A04**
Access EPA: Public Information Tools, Major EPA Dockets, Clearinghouses and Hotlines, Records Management Programs, Major EPA Environmental Databases, Library and Information Services, State Environmental Libraries. 1991 Edition. Information guide.
Environmental Protection Agency, Washington, DC. Information Management and Services Div.
Jul 91, 500p EPA/IMSD-91/100
Also available from Supt. of Docs. See also PB91-151639.

ACCESS EPA is a series of directories aimed at improving public accesss to EPA's environmental information. In the consolidated edition of ACCESS EPA, the individual directories are arranged as seven chapters. Each Chapter in ACCESS EPA begins with a brief introduction and table of contents. In some instances, supplementary material is provided at the end of the chapter. With the exception of Chapter 7, 'State Environmental Libraries' each of the chapters has information on or about the EPA. Included in the publication is a list of acronyms that appear throughout ACCESS EPA, a State Information index, and a name/title/subject index. An ACCESS EPA Update and Comments Form is also included for use in updating information or to notify the authors of new entries to be included in the publication.

Keywords: *Information management, *Public access, *Environmental impacts, *Directories, Libraries, States(United States), Indexes(Documentation), *US EPA.

PB91-151571/REB PC **E99**/MF **A02**
Access EPA: Public Information Tools. 1991 Edition. Information guide.
Environmental Protection Agency, Washington, DC. Information Management and Services Div.
Jul 91, 105p EPA/IMSD-91/101
Also available from Supt. of Docs. See also PB91-151563.

The Public Information Tools directory is a part of the ACCESS EPA series which is maintained by the Information Access Branch, Information Management and Services Division, Office of Information Resources Management. The purpose of the ACCESS EPA series is to improve public access to EPA's environmental information. Public Information Tools is arranged to enhance the reader's understanding of environmental information.

Keywords: *Information management, *Environmental impacts, *Public access, *Directories, Hazardous materials, Technology transfer, Legislation, Test methods, Risk assessment, Toxic substances, US EPA.

PB91-151589/REB PC **E99**/MF **A01**
Access EPA: Major EPA Dockets. 1991 Edition. Information guide.
Environmental Protection Agency, Washington, DC. Information Management and Services Div.
Jul 91, 28p EPA/IMSD-91/102
Also available from Supt. of Docs. See also PB91-151511 and PB90-237066.

Major EPA Dockets contains information on the collections and services of the Agency's docket programs. It is designed as a guide for EPA staff, other government agencies and the public who require information about EPA reulmakings. Rulemaking, or regulation development as it is called in EPA, is defined as the agency process for formulating, amending, or repealing a rule. Rules establish the particular policies and procedures used in carrying out the statutory goals established by Congress.

Keywords: *Information retrieval, *Regulations, *Environmental protection, *US EPA, Data bases, Guidelines, Statutes, Services, Documents, Dockets, Clean Air Act, Federal Insecticide, Fungicide and Rodenticide Act, Resource Conservation and Recovery Act, Superfund, Safe Drinking Water Act.

PB91-151597/REB PC **E99**/MF **A01**
Access EPA: Clearinghouses and Hotlines. 1991 Edition. Information guide.
Environmental Protection Agency, Washington, DC. Information Management and Services Div.
Jul 91, 57p EPA/IMSD-91/103
Also available from Supt. of Docs. See also PB91-151589 and PB90-237082.

Many clearinghouses, hotlines, and electronic bulletin boards have been developed by the Environmental Protection Agency (EPA) to respond to legislative initiatives requiring the Agency to provide outreach, communications, and technology transfer. Clearinghouses and Hotlines was developed to provide information and foster communications about clearinghouses, hotlines, and electronic bulletin boards within the Agency. With the exception of The National Response Center, all clearinghouses and hotlines listed in the publication are maintained by EPA and its agents.

Keywords: *Information retrieval, *Technical reports, *US EPA, Technology transfer, Data base management, Libraries, States(United States), Air pollution control, Clearing houses, Electronic bulletin boards.

PB91-151605/REB PC **E99**/MF **A01**
Access EPA: Records Management Programs. 1991 Edition. Information guide.
Environmental Protection Agency, Washington, DC. Information Management and Services Div.
Jul 91, 72p EPA/IMSD-91/104
Also available from Supt. of Docs. See also PB91-151597.

Records Management Programs is designed to allow EPA staff and the public to identify records management contacts in each facility or program, and to facilitate communications among records managers Agencywide. It contains information about the records management programs and the services they offer. The mission of the Agency's records management program is to provide records management leadership and expertise to all Agency programs.

Keywords: *Environmental impacts, *Project planning, *Records management, *US EPA, Environmental protection, Hazardous materials, Laboratories, Monitoring, *Superfund, Listings.

PB91-151613/REB PC **E99**/MF **A01**
Access EPA: Major EPA Environmental Databases. 1991 Edition. Information guide.
Environmental Protection Agency, Washington, DC. Information Management and Services Div.
Jul 91, 87p EPA/IMSD-91/105
Also available from Supt. of Docs. See also PB91-151605.

Contents: Major EPA environmental databases air and radiation; Hazardous and solid waste; Pesticides and toxic substances; Water; Cross-program; Appendices.

Keywords: *Information retrieval, *Environmental impacts, *Data bases, *US EPA, Air quality, Facilities, Hazardous materials, Solid waste disposal, Oils, Pesticides, Toxicity, Organic compounds, Inventories, Detection, Information systems, Record of Decision.

PB91-151621/REB PC **E99**/MF **A02**
Access EPA: Library and Information Services. Information guide.
Environmental Protection Agency, Washington, DC. Information Management and Services Div.
Jul 91, 125p EPA/IMSD-91/106
Also available from Supt. of Docs. See also PB90-237074 and PB91-151613.

The U.S. Environmental Protection Agency (EPA) is comprised of a Headquarters Office in Washington, DC, 10 Regional offices, and specialized, scientific laboratories located throughout the country. There are 28 EPA network libraries located in Headquarters and Regional offices and laboratories to support the organizational structure. Other information services include: Environmental Criteria and Assessment Office Technical Information Unit, Cincinnati, OH; Legislative Reference Library, Washington, DC; Public Information Center, Washington, DC.

Keywords: *Information retrieval, *Libraries, *US EPA, Services, Laboratories, Information systems, Hazardous materials, Solid waste disposal, Sites, Monitoring, Regional analysis, Superfund, US EPA Research Laboratory Library.

PB91-151639/REB PC **E99**/MF **A02**
Access EPA. State Environmental Libraries. 1991 Edition. Information guide.
Environmental Protection Agency, Washington, DC. Information Management and Services Div.
Jul 91, 101p EPA/IMSD-91/107
Also available from Supt. of Docs. See also PB91-151621 and PB90-237058.

State Environmental Libraries is part of an EPA initiative to support information sharing between EPA and the States. It contains descriptive information on State environmental library collections and services and contact information for access. Six appendices provide quick reference for subjects, hotlines, and names.

Keywords: *Environmental protection, *Libraries, *States(United States), Pollution control, Waste treatment, Policies, Addresses, Listings, US EPA.

PB91-154096/REB PC **A03**/MF **A01**
Environmental Monitoring Systems Lab., Cincinnati, OH.
Ames 'Salmonella' Mutagenicity Assay Procedures for Water Samples. Protocol A: Sample Collection. Protocol B: Sample Processing. Protocol C: Ames 'Salmonella' Mutagenicity Assay.
New Jersey Dept. of Environmental Protection, Trenton. Div. of Science and Research.
5 Mar 91, 35p EPA/600/4-91/017
Sponsored by Environmental Monitoring Systems Lab., Cincinnati, OH.

The report describes methods for water and wastewater sample collection and processing for the Ames Salmonella mutagenicity assay. Guidelines are provided for sampling equipment, composite sample collection, storage, and handling; sample filtration and extraction and concentration of organic compounds in samples; and the conduct of Ames tests with sample extracts and with samples prior to extraction.

Keywords: *Chemical water pollutants, *Mutagenicity tests, *Salmonella typhimurium, Genotype, pH, Metabolic activation, Field tests, Quality control, Water sampling, Waste water.

PB91-181578/REB PC **A20/MF A03**
Management of Hazardous Waste Leachate, September 1982.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Sep 82, 455p EPA/530/SW-00/871R, EPA/SW-871R
See also PB81-189359.

The document was prepared to provide guidance for permit officials and disposal site operators on available management options for controlling, treating, and disposing of hazardous waste leachates. It discusses considerations necessary to develop sound management plans for leachate generated at surface impoundments and landfills. The manual provides a logical thorough process for arriving at a reasonable treatment process train for given leachates. Furthermore, sufficient factual information is provided so that users can readily identify a few potential treatment alternatives. Having identified such alternatives, users then are given sufficient guidance so that final choices can be made.

Keywords: *Waste management, *Hazardous materials, *Guidelines, *Leaching, Waste disposal, Waste treatment, Permits, Surface impoundments, Earth fills, Emergency planning, Management planning, Substitutes, Land pollution control, Technology utilization, Environmental transport, Environmental monitoring.

PB91-181594/REB PC **A06/MF A01**
Inventory of Open Dumps, June 1985.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Jun 85, 125p EPA/530/SW-00/964R, EPA/SW-964R
See also PB83-209361.

RCRA provides for publication of an inventory of open dumps. The Act defines 'open dumps' as facilities which do not comply with EPA's Criteria for Classification of SW Disposal Facilities and Practices (40 CFR 257). To aid the States in satisfying the requirement that the solid waste management plan shall provide for the closing or upgrading of all existing open dumps within the State, EPA has funded State efforts to identify open dumps so that they can plan to provide for their closure or upgrading. In furtherance of this planning effort, the Act requires that EPA publish an inventory of open dumps. Publication of the inventory will serve to inform the Congress and the public of those facilities which the states have found to be open dumps.

Keywords: *Open dumps, *Solid waste management, *Information transfer, Public information, State government, Tables(Data), Management planning, *Resource Conservation and Recovery Act.

PB91-186999/REB PC **A23/MF A03**
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Enforcement Project Management Handbook. Directive.
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Jan 91, 538p OSWER DIRECTIVE-9837.2-A
Contract EPA-68-01-7331
Supersedes PB90-780115. Sponsored by Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.

The handbook has been prepared as a basic reference and training manual to assist RPMs (Remedial Project Managers) and OSCs (On-Scene Coordinators) in planning, negotiating and managing various enforcement actions.

Keywords: *Hazardous materials, *Waste disposal, Site surveys, Manuals, National government, State government, Law enforcement, Superfund, Remedial action, Pollution regulations, Management planning, Waste management.

PB91-187005/REB PC **A03/MF A01**
Final Guidance on Preparing Waste-In Lists and Volumetric Rankings for Release to Potentially Responsible Parties (PRPs) under CERCLA ('Waste-In' Guidance).
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
22 Feb 91, 30p

The directive provides guidance on the compilation and release of waste-in lists and volumetric rankings to help Regions comply with the information release requirements of CERCLA section 122(e) and the information release and exchange policies outlined in OSWER directives 9835.12 and 9834.10.

Keywords: *Waste management, *Superfund, *Notification procedures, *Hazardous materials, Information transfer, Region analysis, Listings, Guidelines, Rankings, Volume, Remedial action, Decisions and orders, *Office of Solid Waste and Emergency Response, Potentially responsible parties, Management reviews.

PB91-187013/REB PC **A02/MF A01**
Model Informational Notice Letter to Local Governments. Directive.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
7 May 91, 8p OSWER DIRECTIVE-9834.16

The directive is a model letter which will be used to notify local governments of EPA's activities which will take place within their jurisdiction at a Superfund site.

Keywords: *Local government, *Superfund, *Notification procedures, *Waste management, US EPA, Site surveys, Administrative procedures, Municipal wastes, Information transfer, Feasibility studies, Law enforcement, *Office of Solid Waste and Emergency Response, Preremedial actions, Potentially responsible parties.

PB91-187021/REB PC **A02/MF A01**
CERCLA Implementation of Inspector Training Requirements for OSCs/RPMs at the Intermediate Level in STEP and First-Line Supervisors.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
3 Apr 91, 7p OSWER-D-9842.2

The directive provides guidance on how two groups of CERCLA staff can meet or be excepted from the training requirements of EPA Order 3500.1 Inspector Training.

Keywords: *Personnel development, *Superfund, *Waste management, Inspection, Implementation, Standards compliance, Law enforcement, Performance standards, Remedial action, Training, *Office of Solid Waste and Emergency Response, *Structured Training and Evaluation Program.

PB91-187039/REB PC **A02/MF A01**
Questions and Answers About the State Role in Remedy Selection at Non-Fund-Financed Enforcement Sites. Directive.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
18 Apr 91, 7p OSWER DIRECTIVE-9831.9

The directive describes circumstances under which States may select and implement a remedy at NPL sites without first obtaining EPA concurrence.

Keywords: *Waste management, *Superfund, State government, Law enforcement, Standards compliance, Remedial action, State implementation plans, Information transfer, Decisions and orders, Questionnaires, *Office of Solid Waste and Emergency Response, National Priorities List, Record of Decision.

PB91-187054/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Chemfix Technologies, Inc. Solidification/Stabilization Process. Application Analysis Report.
PRC Environmental Management, Inc., Chicago, IL.
M. Evans, N. Wills, M. Keefe, and J. Mann. May 91, 44p EPA/540/A5-89/011
Contract EPA-68-03-3484
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The Chemfix Solidification/Stabilization treatment process was evaluated under EPA's SITE program. The process reduced leaching levels of lead and copper. Physical testing results were acceptable. Appropriate applications and process limitations are discussed in the report.

Keywords: *Solidification, *Stabilization, *Superfund, *Waste treatment, *Hazardous materials, Technology utilization, Performance evaluation, Environmental protection, Pollution regulations, Economic analysis, Leaching, Polychlorinated biphenyls, Metals, Process charting, Soil treatment, *Chemfix process, *Superfund Innovative Technology Evaluation Program, Cleanup operations.

PB91-196485/REB PC **A03/MF A01**
QSAR Modelling of the ERL-D Fathead Minnow Acute Toxicity Database. Journal article.
Environmental Research Lab.-Duluth, MN.
M. Nendza, and C. L. Russom. c1991, 26p EPA/600/J-91/068
Pub. in Xenobiotica, v21 n2 p147-170 1991. Prepared in cooperation with Fraunhofer-Inst. fuer Umweltchemie und Oekotoxikologie, Schmallenberg (Germany, F.R.).

Regression analysis has been applied to examine the structure-activity relationships regarding the acute fish toxicity (96 h LC50 fathead minnow) of organic chemicals. The log P dependent baseline toxicity model has been confirmed for a data set composed of 618 compounds from 24 chemical classes associated with a putative common mode of action. Covariance analysis of the discrete by class regression functions resulted in the combination of chemicals to subsets associated with their mode of action. Separate models were derived for nonpolar (Class I) and polar (Class II and III) compounds. Chemicals which are more toxic than estimated from the baseline model are identified. (Copyright (c) 1991 Taylor and Francis, Ltd.)

Keywords: *Water pollution effects(Animals), *Toxicity, *Minnows, *Organic chemicals, Data bases, Regression analysis, Tables(Data), Reprints, *Foreign technology, *Quantitative structure-activity relationships model, Listings.

PB91-201061/REB PC **A99/MF A04**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Problem Principal Organic Hazardous Constituents (POHC) Reference Directory. Documentation. Final rept.
Southern Research Inst., Birmingham, AL.
K. W. Baughman, R. H. James, R. B. Spafford, and C. H. Duffey. Jan 91, 615p EPA/600/3-90/094 , , EPA/DF/DK-91/086A
Contract EPA-68-02-4442
For system on diskette, see PB91-507749. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The hazardous waste incineration program is highly dependent on the regional permit writers and their knowledge of analytical methods for determining principal organic hazardous constituents (POHCs). Every trial burn plan must be approved by the regional permit writer. Because of the myriad of compounds that are proposed as test chemicals and because of the ever-changing status of analytical methodology for trace organic analysis, a tremendous burden is placed on the permit writer to stay abreast of the developments in the field. Currently there is no means to keep permit writers informed of advances in measurement technology. Measurement methods for many of the Appendix VIII compounds have only been developed in the last few years. Many compounds, designated 'problem POHCs' are difficult to determine or cannot be determined at all with current technology. The purpose of the report was to assemble data on the Appendix VIII compounds relative to their analytical method status, physical properties and combustion properties. The objective is to provide regional hazardous waste permit writers with immediate access to these data to assist them in their review of trial burn sampling and analysis plans.

Keywords: *Hazardous materials, *Waste disposal, *Physicochemical properties, *Air pollution sampling, *Directories, Incineration, Permits, Regional analysis, Combustion efficiency, Gas analysis, Ranking, Air pollution detection, Organic compounds, Data(Tables), *Principal organic hazardous constituents.

PB91-201095/REB PC **A06**/MF **A01**
Exposure Version 2: A Computer Model for Analyzing the Effects of Indoor Air Pollutant Sources on Individual Exposure. Documentation. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
L. E. Sparks. Apr 91, 103p EPA/600/8-91/013, EPA/SW/DK-91/088A
For system on diskette, see PB91-507764.

The report presents a model for calculating individual exposure to indoor pollutants from sources. The model calculates exposure due to individual, as opposed to population, activity patterns and source use. The model uses data on source emissions, room-to-room air flows, air exchange with the outdoors, and indoor sinks to predict concentration/time profiles for all rooms. The concentration/time profiles are then combined with individual activity patterns to estimate exposure. The model allows analysis of the effects of air cleaners located in either or both the central air circulating system or individual rooms on indoor air quality (IAQ) and exposure. The model allows simulation of a wide range of sources including long term steady state sources, on/off sources, and decaying sources. Several sources are allowed in each room. The model allows the analysis of the effects of sinks and sink re-emissions on IAQ. The results of test house experiments are compared with model predictions. The agreement between predicted concentration/time profiles and experimental data is good. The average deviation of the predicted value from the experimental value is less than 30% for all experiments, and the maximum deviation is less than 60%.

Keywords: *Indoor air pollution, *Air pollution sources, *Computerized simulation, *Public health, *Air pollution effects(Humans), Documentation, Mathematical models, Exposure, Houses, Air quality, Air flow, Residential buildings, Air pollution sampling, Comparison, Concentration(Composition), Air cleaning systems.

PB91-201459/REB PC **A08**/MF **A01**
Pesticide Monitoring: Illinois EPA's Summary of Results, 1985-1989.
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
L. Moyer, and J. Cross. Dec 90, 154p IEPA/WPC/90-297

In October 1985, the Illinois Environmental Protection Agency (IEPA) expanded pesticide monitoring in surface waters to include herbicides and organophosphate insecticides commonly used in agricultural practices. Pesticides selected include seven herbicides (alachlor, atrazine, butylate, cyanazine, metolachlor, metribuzin, trifluralin), seven organophosphate insecticides (chloropyrifos, diazinon, fonofos, malathion, methyl parathion, phorate, terbufos) and one fungicide (captan). Monitoring efforts included the establishment of the Pesticide Monitoring Subnetwork within IEPA's existing Ambient Water Quality Monitoring Network (AWQMN) as well as intensive monitoring related to storm event runoff. The pesticide subnetwork consists of 30 stations within the 208 station AWQMN, and are located in predominately agricultural watersheds in Illinois. Intensive monitoring related to storm event runoff was conducted at two stations; Macoupin Creek in Macoupin County and Spring Creek in Sangamon County. The report summarizes surface water results from both monitoring efforts and provides future considerations regarding IEPA's pesticide monitoring programs.

Keywords: *Pesticides, *Environmental monitoring, *Water pollution sampling, Agricultural chemicals, Herbicides, Insecticides, Storm water runoff, US EPA, Forecasting, Fungicides, Agricultural runoff, Watersheds, Illinois, Surface waters, Organic phosphates.

PB91-201467/REB PC **A08**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Municipal Pollution Control.
Financial Management Evaluation. Appendices (Wastewater Utility).
Sumter Area Technical Coll., SC. Environmental Training Center.
L. A. Parker. Aug 89, 159p WH-546-APP
Grant EPA-CT-901659-1-0
See also PB91-206177. Prepared in cooperation with Parker (Larry A.) and Associates, Inc., Wheeling, WV. Sponsored by Environmental Protection Agency, Washington, DC. Office of Municipal Pollution Control.

The booklet contains an outline for making an intensive financial management evaluation of a wastewater utility and a compilation of various materials in associated Appendices that aid in such an evaluation. After an initial financial review has been made, a more complex investigation may be desirable. This type of evaluation would normally require about four visits by the investigators. The in-depth Facility Review Outline contains a suggested schedule of activities to discuss on each of four visits. The report contains a series of questions intended to guide the interviewer in the intensive evaluation of the various units that make up a typical wastewater management system.

Keywords: *Waste water treatment, *Utilities, *Financial management, *Evaluation, *Sewage treatment plants, Budgeting, Cost control, Planning, Financing, Personnel, Reporting.

PB91-204354/REB PC **A10**/MF **A03**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Design, Construction, and Operation of Hazardous and Non-Hazardous Waste Surface Impoundments. Technical rept.
PEI Associates, Inc., Cincinnati, OH.
R. P. Hartley. Jun 91, 203p EPA/530/SW-91/054
Contract EPA-68-03-3413
Prepared in cooperation with Brown (K.W.) and Associates, Inc., College Station, TX., and Jordan (Edward C.) Co., Inc., Portland, ME. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The Technical Resource Document provides current information on the design, construction, and operation of surface impoundments used for the treatment, storage, or disposal of hazardous and non-hazardous wastes. The pertinent regulations under the Resource Conservation and Recovery Act (RCRA) are summarized. Surface impoundment structures that will meet the regulatory requirements are described. RCRA's 'minimum technology requirements' specify double-lined structures with a leak collection and removal layer between the two liners. Dikes, liners, and leak collection layers may be constructed of combinations of soils and synthetic materials in multilayer systems. Other components, also described in the document, include leak detection systems, secondary containment, and liquid level monitoring systems. Methods for closing surface impoundments, either in-place or by waste removal, are described. In-place closure requires waste treatment and stabilization and the installation of a landfill cover that also must meet minimum technology regulatory requirements. Cover technology is also summarized. Details of the technologies summarized in the document may be found in the many references cited.

Keywords: *Surface impoundments, *Waste disposal, *Waste treatment, *Waste storage, Hazardous materials, Design criteria, Construction, Operation, Pollution regulations, Membranes, Leakage, Linings, Land pollution control, Land pollution abatement, Closures, Stabilization, Earth fills, Remedial action, Resource Conservation and Recovery Act, Capping, Landfill covers.

PB91-205021/REB PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Crosswalk/Air Toxic Emission Factor Data Base Management System. User's Manual. Final rept.
Radian Corp., Research Triangle Park, NC.
G. N. Patterson. Aug 90, 58p EPA/450/2-89/018, , EPA/SW/DK-91/093A
Contract EPA-68-02-4392
For system on diskette, see PB91-507889. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The report presents instructions on the Crosswalk/Air Toxic Emission Factor data management system (XATEF). The system was designed to allow rapid identification and cross-referencing of toxic air pollutant/emission source associations and to provide corresponding emission factors for these associations as available. The system contains Standard Industrial Classification (SIC) code/Source Category Code (SCC)/pollutant cross-references found in Toxic Air Pollutant/Source Crosswalk - A Screening Tool For Locating Possible Sources Emitting Toxic Air Substances, Second Edition, EPA-450/2-89-017; and air toxic emission factors compiled in Toxic Air Pollutant Emission Factors - A Compilation For Selected Air Toxic Compounds And Sources, Second Edition, EPA-450/2-90-011. The program has modules that allow users to search and download data to printers or files. The purpose of the report is to document the usage of the system. EPA is making available the system and data to agency users on one high density (1.2 MB) diskette.

Keywords: *User manuals(Computer programs), *Air pollution, *Emission factors, *Toxic substances, *Pollution sources, Information systems, Documentation, Data base management, Industrial wastes, Air pollution control, Chemical compounds, Standard industrial classification, *XATEF system, Crosswalk/Air Toxic Emission Factor system, Source Category Code, Chemical nomenclature, Chemical Abstracts Service number.

PB91-205153/REB PC **A10**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Indoor Air Quality Simulator for Personal Computers. Volume 1. Technical Manual. Final rept. Oct 87-Oct 89.
Research Triangle Inst., Research Triangle Park, NC.
P. A. Lawless, and M. K. Owen. Apr 91, 207p EPA/600/8-91/014A, , EPA/SW/DK-91/092A
For system on diskette, see PB91-507871. Supersedes PB89-133607. See also Volume 2, PB91-205161. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The two-volume report describes the development of an indoor air quality simulator for personal computers (IAQPC), a program that addresses the problems of indoor air contamination. The program--systematic, user-friendly, and computer-based--can be used by administrators and engineers in developing control approaches to achieve acceptable concentrations of pollutants indoors. The technical manual introduces the IAQPC, provides the theoretical background of the program, and offers details of the algorithms. The manual should be useful to the experienced user and to those who are interested in the fundamentals of the program. The user's guide provides information on operation of the program. An extension of BASIC (QuickBASIC 4.0) was selected to accommodate the complexities of the indoor air space, maintain speed in calculations, and allow easy updates when new or improved data become available. Inputs to the program include indoor space, pollutant sources, sinks, and HVAC system descriptions. Locations and types of air cleaners may be specified. Output from the IAQPC includes printouts to screen, file, or printer of input values; calculated concentrations with respect to time and location; and graphical presentations of the concentrations.

Keywords: *Indoor air pollution, *Air quality, *Air pollution sampling, *Computerized simulation, *Manuals, Mathematical models, Documentation, Buildings, Pollution sources, Environmental engineering, Personal computers, Concentration(Composition), Ventilation, Heating systems, Air conditioning, Air pollution control, BASIC programming language.

PB91-205161/REB PC **A05**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Indoor Air Quality Simulator for Personal Computers. Volume 2. User's Guide. Final rept. Oct 87-Oct 89.
Research Triangle Inst., Research Triangle Park, NC.
P. A. Lawless, and M. K. Owen. Apr 91, 78p EPA/600/8-91/014B, , EPA/SW/DK-91/092B
For system on diskette, see PB91-507871. Supersedes PB89-133607. See also Volume 1, PB91-205153. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The Indoor Air Quality Simulator for Personal Computers, IAQPC, was developed to address the problem of indoor air contamination. The program uses menus for the data input and to specify output. The IAQPC gives concentration profiles to cover up to 62 days for up to 6 pollutants based on information entered on a building layout, the HVAC (heating, ventilating, and air-conditioning) system parameters, and source and sink data. The building layout is chosen from six standard configurations. The building must be single-story and

may have up to 20 rooms. The room volumes and the cross-sectional areas of the interconnections between the rooms (doors, cracks) may be entered. The HVAC parameters include the amount of outdoor air entering the building and the schedule of the HVAC system. Airflows for the building are calculated by the program. The Users' Guide presents an introduction to IAQPC, menu instructions, a tutorial, and brief descriptions of the meanings and reasonable inputs for the variables.

Keywords: *User manuals(Computer programs), *Indoor air pollution, *Air quality, *Air pollution sampling, *Computerized simulation, Buildings, Pollution sources, Documentation, Mathematical models, Environmental engineering, Personal computers, Concentration(Composition), Ventilation, Heating systems, Air conditioning, Air pollution control, BASIC programming language.

PB91-205484/REB PC **A01/MF A01**
Removal Program Priorities.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
31 Mar 88, 5p OSWER DIRECTIVE-9360.0-18

The directive contains general policy guidelines regarding removal program priorities as it specifically relates to the 10 regional offices. Emphasis is placed on addressing the most serious public health and environmental threats (classic emergencies, time-critical removals at NPL sites, and time-critical removals at non-NPL sites). Regions are urged to pursue cleanup by the responsible parties (RP) and manage the removal program within the boundaries of their resources.

Keywords: *Superfund, *Waste management, *Hazardous materials, Guidelines, Remedial action, Administrative procedures, Management planning, Decision making, Regional analysis, *Office of Solid Waste and Emergency Response, Cleanup operations, Remedial response, National Priorities List, Potential responsible parties.

PB91-205492/REB PC **A03/MF A01**
Implementation of the Decentralized Contractor Performance Evaluation and Award Fee Process for Selected Remedial Program Contracts.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
9 Mar 87, 14p OSWER DIRECTIVE-9242.3-07

The directive is intended to: (1) further develop Regional infrastructures for managing contracts in advance of implementation of the Alternative Remedial Contracts Strategy (ARCS); (2) effect the Agency's policy of decentralizing Superfund activities to the Regions, consistent with other program delegations; (3) focus accountability for contractor performance monitoring on the individuals who are responsible for site specific Program operations; (4) allow those most familiar with a contractor's performance and determine the amount of fee to be awarded; and (5) increase communication between Agency and contractor personnel at all operational and management levels. The Standard Operating Procedure (SOP) defines the roles and responsibilities of key Regional, Headquarters, and Contractor personnel and defines the basic structure and operation of the award fee process, as well as establishes minimum requirements for contractor performance evaluations and award fee decisions.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Remedial action, Performance evaluation, Contractors, Implementation, Personnel, Operations, Charges, Management plannings, Decision making, Awards, Substitutes, Standards, *Office of Solid Waste and Emergency Response, Alternative Remedial Contracts Strategy.

PB91-206177/REB PC **A04/MF A01**
Environmental Protection Agency, Washington, DC. Office of Municipal Pollution Control.
Financial Management Evaluation Handbook for Wastewater Utility.
Sumter Area Technical Coll., SC. Environmental Training Center.
L. A. Parker. Aug 89, 56p WH-546
Grant EPA-CT-901659-1-0
See also PB91-201467. Prepared in cooperation with Parker (Larry A.) and Associates, Inc., Wheeling, WV. Sponsored by Environmental Protection Agency, Washington, DC. Office of Municipal Pollution Control.

Wastewater facilities are capital intensive and highly complex systems involving management techniques that are not typical of normal government operations. The United States Congress expects these wastewater utilities to have sophisticated management procedures, since these facilities are governed by the laws and regulations of the country. Many systems were built using funds appropriated by the Congress requiring that they be managed properly for the benefit of the people. The handbook has been specifically designed for on-site inspectors to use in evaluating the financial management capability of wastewater utility systems that have been funded by federal construction grants. It has been specifically designed for small systems treating less than 5 mgd of wastewater per day.

Keywords: *Financial management, *Sewage treatment plants, *Handbooks, *Waste water treatment, *Evaluation, Utilities, Inspection, Construction grants, Operations, Operating costs, Management planning, Budgeting, Liabilities, Water utilization, Billing, Cash flow, Rates(Costs), Small systems.

PB91-206268/REB PC **A06/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Gridded Model Information Support System (GMISS) User's Guide. Volume 2. UAM Subsystem.
Computer Sciences Corp., Research Triangle Park, NC.
T. A. Dessent. 25 Feb 91, 103p EPA/450/4-91/009
Contract EPA-68-01-7365
See also PB91-131268. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The Gridded Model Information Support System (GMISS) is a data base management system for selected Regional Oxidant Model (ROM) input data and species concentrations produced by gridded photochemical air pollution models. The UAM Subsystem allows state and local agencies to use these data to set initial and boundary conditions for the Urban Airshed Model. Selected data may be retrieved and used to build input files to the ROM/UAM Interface System which converts the data from ROM grid cell and vertical layer dimensions to UAM grid cell and vertical dimensions. The document describes how to invoke and execute the UAM Subsystem using the full screen menus.

Keywords: *User manuals(Computer programs), *Air pollution, Information systems, Data base management systems, Computerized simulation, Photochemical reactions, Regional analysis, Input/output routines, *Urban Airshed Model, *Gridded Model Information Support System, Regional Oxidant Model.

PB91-206276/REB PC **A05/MF A01**
Environmental Protection Agency, Washington, DC. Office of Municipal Pollution Control.
Assessment of Single-Stage Trickling Filter Nitrification.
HydroQual, Inc., Mahwah, NJ.
O. K. Scheible, and A. Gupta. May 91, 95p EPA/430/9-91/005
Contract EPA-68-08-0023
Sponsored by Environmental Protection Agency, Washington, DC. Office of Municipal Pollution Control.

The report is part of a larger effort to compare different wastewater technologies that can achieve nitrification. The report evaluates the use of trickling filters for nitrification of municipal wastewater. The study originally focused on single-stage trickling filters, a biological process application wherein carbon oxidation and nitrification are accomplished within the same unit without separation of the biomass used to accomplish these operations.

Keywords: *Sewage treatment plants, *Trickling filtration, *Nitrification, Biological treatment, Performance evaluation, Design criteria, Operations, Oxidation, Tables(Data), Biomass.

PB91-206342/REB PC **A06/MF A02**
Light-Duty Automotive Technology and Fuel Economy Trends through 1991. Technical rept.
Environmental Protection Agency, Ann Arbor, MI. Control Technology and Applications Branch.
R. M. Heavenrich, J. D. Murrell, and K. H. Hellman.
May 91, 103p EPA/AA/CTAB-91/02
Supersedes PB90-235425.

The report examines trends in light-duty automotive technology and fuel economy for model years 1975 through 1991. Comparisons are made with previous year's data for the fleet as a whole, and for number of cylinders, vehicle size class, weight class, and market segment (Domestic, European, and Asian).

Keywords: *Fuel economy, *Trends, *Fuel consumption, *Automobiles, Motor vehicle engines, Vehicle size, Technology assessment, Automotive fuels, Thermal efficiency, Trucks, Tables(Data).

PB91-206359/REB PC **A12/MF A02**
Office of Toxic Substances Scientific and Technical Reports: 1983-1988.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Sep 90, 253p EPA/560/7-89/003
See also PB83-152173.

The publication contains bibliographic citations with abstracts of the Office of Toxic Substances' scientific and technical reports submitted to the National Technical Information Service between the years 1983-1988. Sections in the order of arrangement are report Title, Personal Author, Corporate Author, EPA Order/Report Number, EPA/OTS Publications Bibliography and Subject Index.

Keywords: *Toxic substances, *Bibliographies, *Environmental pollutants, Indexes(Documentation).

PB91-206599/REB PC **A06/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Evaluation of Soil Washing Technology: Results of Bench-Scale Experiments on Petroleum-Fuels Contaminated Soils.
Camp, Dresser and McKee, Inc., Cambridge, MA.
M. E. Loden. Jun 91, 104p EPA/600/2-91/023
Contract EPA-68-03-3409
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency through its Risk Reduction Engineering Laboratory's Releases Control Branch has undertaken research and development efforts to address the problem of leaking underground storage tanks (USTs). Under this effort, EPA is currently evaluating soil washing technology for cleaning up soil contaminated by the release of petroleum products from leaking underground storage tanks. Soil washing is a dynamic physical process which remediates contaminated soil via two mechanisms--particle separation and dissolution of the contaminants into the washwater. As a result of the washing process, a significant fraction of the contaminated soil is cleaned and can be returned into the original excavation or used as cleaned 'secondary' fill or aggregate material. Since the contaminants are more concentrated in the fine soil fractions, their separation and removal from the bulk soil increases the overall effectiveness of the process. Subsequent treatment will be required for the spent washwaters and the fine soil fractions. The soil washing program evaluated the effectiveness of soil washing technology in removing petroleum products (unleaded gasoline, diesel/home heating fuel, and waste crankcase oil) from an EPA-developed Synthetic Soil Matrix (SSM) and from actual site soils. Operating parameters such as contact time, washwater volume, rinsewater volume, washwater temperature, and effectiveness of additives were investigated.

Keywords: *Soil treatment, *Washing, *Remedial action, *Petroleum products, *Land pollution, Soil contamination, Underground storage, Oil spills, Leakage, Storage tanks, Gasoline, Environmental transport, Performance evaluation, Technology utilization, *Cleanup operations.

PB91-206797/REB PC **A04/MF A01**
Summary of State Radon Programs, 1989.
Office of Radiation Programs, Washington, DC.
Sep 90, 67p EPA/520/1-91/015
See also PB91-206821 and PB88-111067.

The report characterizes State Radon programs as of September 1989, before implementation of activities under the State Indoor Radon Grants (SIRE) Program Administered by the U.S. Environmental Protection

Agency (EPA). It is based on information collected by EPA Regional offices from the States. It extends and updates a 1987 study of State Radon programs jointly produced by EPA and the Conference of Radiation Control Program Directors (CRCPD).

Keywords: *Project management, *States(United States), *Radon, *Air pollution control, Publicity, Mass media, Citizen participation, Public health, Legislation, Surveys, Measurement, Residential buildings, Public buildings, Training, Technical assistance, Tests, Government policies, *Indoor air pollution, State Indoor Radon Grants Program, Mitigation projects.

PB91-206821/REB PC **A10**/MF **A02**
Summary of State Radon Programs, 1989. Appendix.
Office of Radiation Programs, Washington, DC.
Dec 90, 202p* EPA/520/1-91/015-1
See also PB91-206797 and PB88-117981.

The appendix is a companion volume to the 1989 Summary of State Radon Programs by EPA. It provides a State-by-State description of State Radon programs as of September 1989.

Keywords: *Project management, *States(United States), *Radon, *Air pollution control, Government policies, Publicity, Legislation, Public health, Local government, Technical assistance, Measurement, Businesses, State government, Documents, Test methods, *Indoor air pollution, State Indoor Radon Grants Program, Mitigation projects.

PB91-206862/REB PC **A03**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Increasing Levels of Environmental Mutagens: Potential for Affecting Viral Evolution and Pathogenicity: A Speculative Review. Journal article.
Oklahoma State Univ., Stillwater. Dept. of Microbiology and Cellular Biochemistry.
R. V. Miller. c1991, 50p EPA/600/J-90/514
Pub. in Jnl. of Environmental Science and Health (Envir. Carcino. Revs.), C8 n1 p89-137 1990. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

The article examines available data concerning the ways in which information contained in viral genomes is altered. Mechanisms of damage and repair of nucleic acids are discussed. Information available on the rates of evolution of various viruses is summarized. Contents are as follows: Introduction; Frequency of Viruses in Nature; Replication of Viral Nucleic Acid; DNA Damaging Agents and Mutation; Environmental DNA Damaging Agents; The Repair of DNA Damage; Recombination; Transposition; Rates of Evolution of Viruses; Conclusions.

Keywords: *Environmental pollutants, *Mutagens, *Virus diseases, *Epidemiology, Water microbiology, Soil microbiology, Enteric viruses, Viral RNA, Viral DNA, DNA polymerases, DNA damage, Toxic substances, Radiation, SOS response(Genetics), DNA repair, Mutation, Reprints.

PB91-206870/REB PC **A02**/MF **A01**
Anomalies in the Enumeration of Starved Bacteria on Culture Media Containing Nalidixic Acid and Tetracycline. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
F. J. Genthner, J. Upadhyay, R. P. Campbell, and B. R. S. Genthner. c1990, 8p EPA/600/J-90/515
Pub. in Microbial Ecology 20, p283-288 1990. Prepared in cooperation with Virginia Polytechnic Inst. and State Univ., Blacksburg, and Technical Resources, Inc., Gulf Breeze, FL.

Culturable counts of antibiotic resistant, genetically engineered Pseudomonas fluorescens were determined on antibiotic-containing plate count agar during starvation in water. The mean of the colony counts on plate count agar with or without tetracycline (4.9 times ten to the sixth power/ml) was significantly higher than mean colony counts on plate count agar containing either nalidixic acid or nalidixic acid plus tetracycline (2.5 times ten to the sixth power/ml). After 20 days of starvation the highest mean colony counts continued to be obtained on plate count agar (7.2 times ten to the sixth power/ml) with slightly, but significantly, lower counts obtained on plate count agar containing either nalidixic acid (5.6 times ten to the sixth power/ml) or tetracycline (1.5 times ten to the sixth power/ml). A combination of nalidixic acid and tetracycline in plate count agar, however, dramatically reduced colony counts (8.3 x 100/ml) after the starvation period. The addition of catalase to plate count agar containing nalidixic acid and tetracycline negated the effect caused by the combination.

Keywords: *Pseudomonas fluorescens, *Culture media, *Tetracycline, *Nalidixic acid, Antibiotic resistance, Microbial drug resistance, Genetic engineering, Catalase, Starvation, Microbial colony count, Reprints.

PB91-206888/REB PC **A03**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Pollutant Dynamics as Influenced by Seagrass Beds: Experiments with Tributyltin in 'Thalassia' Microcosms. Journal article.
Cornell Univ., Ithaca, NY. Ecosystems Research Center.
S. N. Levine, D. T. Rudnick, J. R. Kelly, R. D. Morton, and L. A. Buttel. c1990, 28p EPA/600/J-90/516
Pub. in Marine Environmental Research 30, p297-322 1990. Prepared in cooperation with University of West Florida, Pensacola. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

Partitioning, degradation, and bioaccumulation of the potent biocide tributyltin (TBT) was measured in marine microcosms that included sediment cores from a subtropical seagrass bed (with Thalassia testudinum and associated fauna). Over 3 or 6 weeks, 48 microcosms were dosed with (14)C-labelled TBT, and flushed with flowing seawater between doses. TBT was rapidly removed from the water column, with half times of only 10-20 h. Adsorption onto sediments and grasses was temporary; however, at harvest, the seagrass microcosms contained just 15-20% of the (14)C that was added, and half of this label was in degradation products. The initial attraction between TBT and seagrasses and sediments provided a means for TBT concentration that lead to its accumulation in Fauna; at harvest, 2-6% of the (14)C in microcosms was in animals. Thus, TBT must continue to be viewed as a hazardous compound, and seagrass beds should be considered vectors for distribution of TBT through coastal food chains.

Keywords: *Tributyltin, *Water pollution effects(Plants), *Seagrasses, *Marine biology, Aquatic ecosystems, Toxic substances, Food chains, Sediments, Carbon 14, Reprints, Thalassia testudinum.

PB91-206896/REB PC **A03**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Explanation for the Decline of Bacteria Introduced into Lake Water. Journal article.
Cornell Univ., Ithaca, NY. Lab. of Soil Microbiology.
K. R. Gurijala, and M. Alexander. c1990, 16p EPA/600/J-90/517
Pub. in Microbial Ecology 20, p231-244 1990. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

The sizes of the populations of individual bacterial species diminished following their addition to water from lakes with different trophic levels at temperatures of 5, 10, 15, and 30 C. Some species persisted after their initial reduction in cell numbers, but others were undetectable after 3 to 15 days. The decline of these introduced bacteria was not a result of their inoculation at higher densities than are found in nature. Protozoan predation was a significant factor in the fall in bacterial populations sizes because protozoa increased in numbers as the bacterial density fell, the suppression of protozoa led to the elimination or delay of the decline of the bacteria, and the addition of protozoa to lake water in which indigenous protozoa were suppressed produced the same pattern of bacterial elimination as in untreated lake water. (Copyright (c) Springer-Verlag New York Inc. 1990.)

Keywords: *Aquatic bacteria, *Aquatic biology, *Lakes, *Biological stress, *Environmental effects, Water pollution effects, Bioindicators, Temperature dependence, Population growth, Protozoa, Microorganisms, Aquatic ecosystems, Reprints.

PB91-206938/REB PC **A02**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Para-Hydroxybenzoate as an Intermediate in the Anaerobic Transformation of Phenol to Benzoate. Journal article.
Technical Resources, Inc., Gulf Breeze, FL.
B. R. Sharak Genthner, G. T. Townsend, and P. J. Chapman. c1991, 7p CONTRIB-717, EPA/600/J-91/100
Contract EPA-68-03-3479
Pub. in FEMS (Federation of European Microbiological Societies) Microbiology Letters 78, p265-270 1991. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

Anaerobic phenol transformation was studied using a consortium which transformed phenol to benzoate without complete mineralization of benzoate. Products of monofluorophenol transformation indicated para-carboxylation. Phenol and benzoate were detected during para-hydroxybenzoate (p-OHB) degradation. p-OHB was detected in phenol-transforming cultures containing 6-hydroxynicotinic acid (6-OHNA), a structural analogue of p-OHB, or at elevated initial concentrations of phenol (> or = 5 mM), or benzoate (> or = 10 mM). (Copyright (c) 1991 Federation of European Microbiological Societies.)

Keywords: *Parabens, *Biotransformation, *Anaerobic bacteria, *Phenol, *Benzoic acids, Mass spectroscopy, Graphs(Charts), High performance liquid chromatography, Reprints.

PB91-206946/REB PC **A02**/MF **A01**
Ocular Chondrosarcomas in 'Rivulus marmoratus' Poey (Short Communication). Journal article.
Environmental Research Lab., Gulf Breeze, FL.
L. A. Courtney, and J. W. Fournie. c1991, 8p EPA/600/J-91/101, CONTRIB-679
Pub. in Jnl. of Fish Diseases, v14 p111-116 1991.

Only one documented case of a malignant cartilaginous tumor has been previously reported from fish, a large cranial chondrosarcoma from the paddlefish, Polyodon spathula (Walbaum). Described here are two chondrosarcomas diagnosed from adult laboratory-reared Rivulus marmoratus Poey, the first reports of the tumor type from an atheriniform fish. Histologically, the tumors consisted of cartilage in various stages of differentiation. These ranged from poorly differentiated areas consisting of a highly cellular, primitive mesenchymal component with numerous mitotic figures and extensive anaplasia to well-differentiated portions expressed as scattered foci of mature cartilage consisting of single and multiple chondrocytes isolated within lacunae. The lesions, possibly arising from the sclera, were invasive into the eye, with elements of the choroid and striated muscle trapped within the tumor matrix.

Keywords: *Fish diseases, *Chondrosarcoma, *Eye neoplasms, *Marine biology, Cell differentiation, Histology, Pathology, Reprints, Rivulus marmoratus.

PB91-206953/REB PC **A02**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Attachment and Replication of 'Pseudomonas aeruginosa' Bacteriophages under Conditions Simulating Aquatic Environments. Journal article.
Stritch School of Medicine, Maywood, IL.
T. A. Kokjohn, G. S. Sayler, and R. V. Miller. c1991, 8p EPA/600/J-91/102
Pub. in Jnl. of General Microbiology, v137 p661-666 1991. Prepared in cooperation with Argonne National Lab., IL. Environmental Research Div., and Tennessee Univ., Knoxville. Dept. of Microbiology. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

Bacterial viruses are important in regulating bacterial population densities in natural aquatic environments, but the dynamics of bacteriophage-bacterial interactions in nature are poorly understood. A study investigated the attachment and replication of three Pseudomonas aeruginosa bacteriophages (one temperate and two virulent) under conditions similar to those found in nature. Attachment and replication of bacteriophages were not impaired at host-cell densities equal to or lower (<10 to the fifth power c.f.u./ml) than those frequently found in aquatic environments when the host cells were physiologically competent to allow phage growth. Attachment (45-93%) to either actively growing or starved cells was not impaired in river water, indicating that attachment is efficient in natural freshwater habitats. However, the replication of bacteriophages was significantly altered in starved cells in river water.

Keywords: *Aquatic ecosystems, *Virus replication, *Bacteriophages, *Pseudomonas aeruginosa, Water

microbiology, Cell adhesion, Virulence, Growth, Reprints, Environmental conditions.

PB91-206961/REB PC **A02/MF A01**
Corvallis Environmental Research Lab., OR.
Mitotic Stability of Transforming DNA Is Determined by Its Chromosomal Configuration in the Fungus 'Cochliobolus heterostrophus'. Journal article.
New York State Coll. of Agriculture and Life Sciences, Ithaca. Dept. of Plant Pathology.
N. P. Keller, G. C. Bergstrom, and O. C. Yoder. c1991, 9p EPA/600/J-91/103
Grant EPA-R-813458
Pub. in Current Genetics, v19 p227-233 1991. Sponsored by Corvallis Environmental Research Lab., OR.

Cochliobolus heterostrophus was transformed with a plasmid (pH1S) containing a bacterial gene (hygB), which confers resistance to the antibiotic hygromycin B when under control of an 838-bp fragment of promoter 1 from C. heterostrophus. The plasmid integrated at either homologous (52% single copy, 33% tandemly repeated copies) or ectopic (4% single copy, 11% tandemly repeated copies) sites on different chromosomes, resulting in four distinct configurations of integrated DNA. All four configurations were highly stable during mitotic growth; virtually no loss of integrated DNA was detected after five subcultures on nonselective medium or after seven cycles of pathogenesis on maize, the normal host of this fungus. However, deletion of integrated DNA was detected after eight or more disease cycles. (Copyright (c) Springer-Verlag 1991.)

Keywords: *Mitosis, *Deoxyribonucleic acids, *Fungi, *Fungal chromosomes, Plasmids, Antibiotic resistance, Hygromycin B, Promotor regions(Genetics), Bacterial genes, Nucleic acid hybridization, Autoradiography, Methylation, Reprints, *Cochliobolus heterostrophus.

PB91-206979/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Stream Chemistry in the Eastern United States. 2. Current Sources of Acidity in Acidic and Low Acid-Neutralizing Capacity Streams. Journal article.
Utah Water Research Lab., Logan.
A. T. Herlihy, P. R. Kaufmann, and M. E. Mitch. c1991, 16p EPA/600/J-91/104
Pub. in Water Resources Research, v27 n4 p629-642 Apr 91. See also Part 1, PB91-206987. Sponsored by Corvallis Environmental Research Lab., OR.

The authors examined anion composition in National Stream Survey (NSS) data in order to evaluate the most probable sources of current acidity in acidic and low acid neutralizing capacity (ANC) streams in the eastern United States. Acidic streams that had almost no organic influence (less than 10% of total anions) and sulfate and nitrate concentrations indicative of evaporative concentration of atmospheric deposition were classified as acidic due to acidic deposition. These acidic streams were located in small forested watersheds in the Mid-Atlantic Highlands (an estimated 1950 km of stream length) and in the Mid-Atlantic Coastal Plain (1250 km). Acidic streams affected primarily by acidic deposition but also influenced by naturally occurring organic anions accounted for another 1180 km of acidic stream length and were located in the New Jersey Pine Barrens, plateau tops in the Mid-Atlantic and Southeast Highlands, and the Florida Panhandle. The total length of streams acidic due to acid mine drainage in the NSS (4590 km) was about the same as the total length of acidic streams likely affected by acidic deposition (4380 km). Acidic streams whose acid anion composition was dominated by organics were located in Florida and the Mid-Atlantic Coastal Plain. In Florida, most of the acidic streams were organic dominated, whereas about half of the streams in the Mid-Atlantic Coastal Plain were organic dominated. Organic-dominated acidic streams were not observed in the Mid-Atlantic and Southeast Highlands. (Copyright (c) 1991 by the American Geophysical Union.)

Keywords: *Streams, *Water chemistry, *Acidification, *Water pollution, *Pollution sources, *Water quality, Acid neutralizing capacity, Natural emissions, Air water interactions, Deposition, Air pollution, Acid mine drainage, Geochemistry, Hydrology, Watersheds, Forests, Anions, pH, Reprints, *Eastern Region(United States), Organic ions, National Stream Survey.

PB91-206987/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Stream Chemistry in the Eastern United States. 1. Synoptic Survey Design, Acid-Base Status, and Regional Patterns. Journal article.
Utah Water Research Lab., Logan.
P. R. Kaufman, A. T. Herlihy, M. E. Mitch, J. J. Messer, and W. S. Overton. c1991, 19p EPA/600/J-91/105
Pub. in Water Resources Research, v27 n4 p611-627 Apr 91. See also Part 2, PB91-206979. Prepared in cooperation with Oregon State Univ., Corvallis. Dept. of Statistics. Sponsored by Corvallis Environmental Research Lab., OR.

To assess the regional acid-base status of streams in the Mid-Atlantic and Southeastern United States, spring baseflow chemistry was surveyed in a probability sample of 500 stream reaches representing a population of 64,300 reaches. Approximately half of the streams had acid neutralizing capacity (ANC) < 200 microeq/L. Acidic streams were located in the highlands of the Mid-Atlantic Region, in coastal lowlands of the Mid-Atlantic, and in Florida. Acidic streams were rare in the highlands of the Southeast. Inorganic monomeric aluminum concentrations were highest in acidic streams of the Mid-Atlantic Highlands where over 70% of the acidic streams had Al(sub im) greater than 100 microg/L, a concentration above which deleterious biological effects have frequently been reported. Dissolved organic carbon concentrations were much higher in lowland coastal streams, compared with inland streams. The authors data support a hypothesis that atmospheric sources and retention control regional patterns in streamwater sulfate concentrations. Most stream watersheds apparently retain the vast majority of total nitrogen loading from wet deposition. The data suggest, however, that atmospheric nitrogen may be reaching streams in the Northern Appalachians. These results show that acidic surface waters are found outside the glaciated Northeastern portions of the U.S. and that watershed sulfate retention is not sufficient to prevent acidic conditions in some Mid-Atlantic Highlands streams. (Copyright (c0 1991 by the American Geophysical Union.)

Keywords: *Streams, *Water chemistry, *Acidification, *Water pollution, *Water quality, Pollution sources, Base flow, Watersheds, pH, Regional analysis, Hydrology, Natural emissions, Site surveys, Acid neutralizing capacity, Deposition, Air water interactions, Air pollution, Sulfates, Reprints, *Eastern Region(United States), Organic ions, National Stream Survey.

PB91-206995/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
PC BEEPOP, an Ecotoxicological Simulation Model for Honey Bee Populations. Journal article.
Montana Univ., Missoula. Div. of Biological Sciences.
J. J. Bromenshenk, J. Doskocil, G. J. Olbu, G. DeGrandi-Hoffman, and S. A. Roth. c1991, 14p
Pub. in Environmental Toxicology and Chemistry, v10 p547-558 1991. Prepared in cooperation with Agricultural Research Service, Tucson, AZ. Sponsored by Corvallis Environmental Research Lab., OR.

PC BEEPOP is a computer model that simulates honey bee (Apis mellifera L.) colony population dynamics. The model consists of a feedback system of interdependent elements, including colony condition (e.g., initial size, reproductive potential of the queen and forager longevity), environmental variability (e.g., weather) and contaminant exposures. It includes a mortality module (BEEKILL) and a chemical-toxicity data base and probit analysis program (BEETOX). PC BEEPOP is a modified version of an existing colony dynamics model, BEEPOP, and can be used as a tool for environmental risk assessments. Results of sensitivity analysis and simulations of various climatic and toxic scenarios are discussed and compared to observed changes in the size and composition of honey bee colony populations. (Copyright (c) 1991 SETAC.)

Keywords: *Ecology, *Toxicology, *Computerized simulation, Mortality, Toxic substances, Data bases, Population dynamics, Risk assessment, Climate, Reprints, *Honey bees, *PC BEEPOP.

PB91-207001/REB PC **A03/MF A01**
Regional Characteristics of Land Use in Northeast and Southern Blue Ridge Province: Associations with Acid Rain Effects on Surface-Water Chemistry. Journal article.
Corvallis Environmental Research Lab., OR.
L. Liegel, D. Cassell, D. Stevens, P. Shaffer, and R. Church. c1991, 13p EPA/600/J-91/107
Pub. in Environmental Management, v15 n2 p269-279 1991. Prepared in cooperation with Southern Forest Experiment Station, New Orleans, LA., and NSI Technology Services Corp., Corvallis, OR.

The Direct/Delayed Response Project (DDRP) is one of several being conducted by the United States Environmental Protection Agency to assess risk to surface waters from acidic deposition in the eastern United States. In one phase of DDRP, land use, wetland, and forest cover data were collected for statistical samples of 145 northeast lakes and 35 southern Blue Ridge Province stream watersheds. Land use and other data were then extrapolated from individual to target watershed populations in both study regions. Project statistical design allows summarization of results for various subsets of the target population. The article discusses results and implications of the land-use and land-cover characterization for both regions. (Copyright (c) 1991 Springer-Verlag New York Inc.)

Keywords: *Water pollution, *Surface waters, *Air water interactions, *Land use, *Acid rain, *Water chemistry, Air pollution, Statistical analysis, Deposition, Precipitation(Meteorology), Water quality, Hydrology, Acidification, Lakes, Watersheds, Regional analysis, Wetlands, pH, Acid neutralizing capacity, Reprints, *Eastern Region(United States), Direct/Delayed Response Project.

PB91-207027/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Regulatory Barriers to Pollution Prevention: A Position Paper of the Implementation Council of the American Institute for Pollution Prevention. Journal article.
Aluminum Co. of America, Pittsburgh, PA.
R. L. Byers. c1991, 7p EPA/600/J-91/109
Pub. in Jnl. of Air and Waste Management Association, v41 n4 p418-422 Apr 91. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Pollution prevention/waste minimization is a win-win-win situation for government, industry, and the public, which offers more than just protection of the environment for all. Industry gains from reduced capital and operating costs, reduced liabilities, cleaner and safer working conditions, conservation of energy and material resources, and the opportunity for government and industry to work together in a cooperative manner. However, a number of regulatory barriers exist which discourage pollution prevention/waste minimization. The paper provides examples from the aluminum, chemical, petroleum, and wood treating industries of how these regulatory barriers become disincentives. To promote pollution prevention/waste minimization, Congress and the U.S. EPA need to reexamine those RCRA provisions which support a command and control strategy that creates the barriers. The barriers include the distinction between value and valueless materials, offsite storage requirements prior to reuse/recycle, the 'Derived from Fuel', the 'Burning for Fuel Rule', land ban technology standards, and RD&D restrictions. A new RCRA Pollution Prevention/Waste Minimization subtitle is proposed to eliminate or minimize these barriers. (Copyright (c) 1991--Air & Waste Management Association.)

Keywords: *Pollution abatement, *Pollution regulations, *Waste management, *Hazardous materials, Revisions, Environmental protection, Information transfer, Public information, Refuse derived fuels, Waste recycling, Waste utilization, Legislature, Permits, Performance standards, Legal aspects, Reprints, *Waste minimization, *Source reduction, Resource Conservation and Recovery Act, Cooperative agreements, Management reviews.

PB91-207035/REB PC **A03/MF A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Field Sampling of Residual Aviation Gasoline in Sandy Soil. Journal article.
Massachusetts Univ., Amherst. Dept. of Civil Engineering.
D. W. Ostendorf, L. E. Leach, E. S. Hinlein, and Y. Xie. c1991, 16p EPA/600/J-91/110
Grant EPA-R-816821

Pub. in Ground Water Monitoring Review, p107-120 Spring 1991. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Two complementary field sampling methods for the determination of residual aviation gasoline content in the contaminated capillary fringe of a fine, uniform, sandy soil were investigated. The first method featured field extrusion of core barrels into pint-size Mason jars, while the second consisted of laboratory partitioning of intact stainless steel core sleeves. The barrel extrusion procedure involved jar headspace sampling in a nitrogen-filled glove box, which delineated the 0.7m thick residually contaminated interval for subsequent core sleeve withdrawal from adjacent boreholes. Soil samples removed from the Mason jars (in the field) and sleeve segments (in the laboratory) were subjected to methylene chloride extraction and gas chromatographic analysis to compare their aviation gasoline content. The barrel extrusion sampling method yielded a vertical profile with 0.10m resolution over an essentially continuous 5.0m interval from the ground surface to the water table. The sleeve segment alternative yielded a more resolved 0.03m vertical profile over a shorter 0.8m interval through the capillary fringe. The two methods delivered precise estimates of the vertically integrated mass of aviation gasoline at a given horizontal location, and a consistent view of the vertical profile as well. In the latter regard, a 0.2m thick lens of maximum contamination was found in the center of the capillary fringe, where moisture filled all voids smaller than the mean pore size. The maximum peak was resolved by the core sleeve data, but was partially obscured by the barrel extrusion observations, so that replicate barrels or a half-pint Mason jar size should be considered for data supporting vertical transport analyses in the absence of sleeve partitions. (Copyright (c) 1991 by the University of Massachusetts.)

Keywords: *Soil contamination, *Aviation fuels, *Land pollution, *Soil analysis, *Oil pollution, Water pollution, Chemical analysis, Sampling, Field tests, Tables(Data), Sands, Concentration(Composition), Extraction, Chromatographic analysis, Moisture content, Oil spills, Environmental transport, Reprints.

PB91-207043/REB PC **A01**/MF **A01**
Stimulation of the Reductive Dechlorination of Tetrachloroethene in Anaerobic Aquifer Microcosms by the Addition of Toluene. Journal article.
Robert S. Kerr Environmental Research Lab., Ada, OK.
G. W. Sewell, and S. A. Gibson. c1991, 5p EPA/600/J-91/111
Pub. in Environmental Science and Technology, v25 n5 p982-984 1991. Prepared in cooperation with NSI Technology Services Corp., Ada, OK.

Chlorinated solvents are among the most common industrial contaminants of groundwater. Tetrachloroethene (PCE) is resistant to aerobic biodegradation; however, it is occasionally reductively dechlorinated in anoxic contaminated aquifers. This is particularly true if the subsurface also contains other organic compounds that can serve as electron donors and whose utilization by subsurface bacteria will deplete the available oxygen. Chlorinated solvents are followed closely in importance as groundwater contaminants by alkylbenzenes. Alkylbenzenes most commonly enter the subsurface in the form of fuel spills and are degraded under both aerobic and anaerobic conditions by subsurface microorganisms. Freedman and Gossett have shown that a number of low molecular weight organic compounds can serve as electron donors for reductive dechlorination, and recently, Scholz-Muramatsu et al. demonstrated that benzoate can also serve as a source of reducing equivalents for reductive dechlorination of PCE. Grbic-Galic and Vogel have shown that benzoate is an intermediate of anaerobic toluene degradation. Overall these findings suggest that certain alkylbenzenes, such as toluene, could potentially serve as electron donors for the reductive dechlorination of PCE. Field studies conducted by this laboratory have suggested that this may indeed be occurring at field sites exposed to both alkylbenzenes and chlorinated solvents. In the study, the biologically mediated interactions of toluene and PCE under anaerobic conditions were investigated by using microcosms constructed with aquifer solids from an area that was exposed to both alkylbenzenes and chlorinated ethenes at the U.S. Coast Guard Air Station, in Traverse City, MI. (Copyright (c) 1991 American Chemical Society.)

Keywords: *Water pollution control, *Biological treatment, *Dechlorination, *Aquifers, *Tetrachloroethylene, Subsurface investigations, Anaerobic processes, Solvents, Reduction(Chemistry), Ground water, Microorganisms, Toluene, Industrial wastes, Gas chromatography, Chemical reactions, Reprints, High performance liquid chromatography.

PB91-207050/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Modification and Characterization of Dry Material Feeder Delivery of Red and Violet Dye Mixtures. Journal article.
ManTech Environmental Technology, Inc., Research Triangle Park, NC.
M. A. Higuchi, and W. H. Steinhagen. c1991, 15p EPA/600/J-91/112
Contract EPA-68-02-4450
Pub. in Inhalation Toxicology, v3 p223-235 Mar 91. Prepared in cooperation with Alltech Associates, Inc., Cary, NC. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

Uniform delivery of dry material for stable concentrations of aerosols in inhalation exposure chambers is essential in inhalation experiments. The paper characterizes an AccuRate dry material feeder with modifications, for different helix sizes, actuation rates, nozzle types and dye mixtures. The basic design of the AccuRate dry material feeder used to deliver precise quantities of dye mixtures is inadequate for aerosol exposure research. To improve delivery, a push-pull type solenoid was mounted to the feeder and connected to a microprocessor controlled timer for actuation. Without the actuator, the coefficient of variability increased with smaller size helixes and reached 35, 34 and 121% for 1/2, 3/8, and 1/4 inch helixes, respectively. With the actuator, the coefficient of variability was reduced to 2.5, 4.8 and 8.8% for the same helix sizes and red dye mixture. The optimum actuation rate was determined to be 90 cycles/min. The use of the stainless steel nozzle improved feed rates by presumably limiting any additional amount of electrostatic charge on dye particles. The modification, addition of actuator with rate of 90 cycles/min to the AccuRate feeder greatly decreased the amount of variability in feed rates for all helixes and dye mixtures, while increasing the dye flow rates. The modification is recommended when dry material characteristics are such that accuracy and precision of feed rates cannot be optimized. (Copyright (c) 1991 by Hemisphere Publishing Corporation.)

Keywords: *Aerosol generators, *Feed mechanisms, *Azo dyes, *Anthraquinones, *Dyes, *Mixtures, *Dusts, Exposure chambers, Performance testing, Statistical analysis, Precision, Design, Reprints, Inhalation toxicology.

PB91-207068/REB PC **A02**/MF **A01**
Method of Sperm Collection Significantly Influences Sperm Motion Parameters Following Ethane Dimethanesulphonate Administration in the Rat. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Reproductive Toxicology Branch.
G. R. Klinefelter, L. E. Gray, and J. D. Suarez. 1991, 8p EPA/600/J-91/113
Pub. in Reproductive Toxicology, v5 n1 p39-44 Jan 91. Prepared in cooperation with NSI Technology Services Corp., Research Triangle Park, NC.

Sperm motion analysis following exposure to a reproductive toxicant is one means of evaluating the functional integrity of the testis and epididymis. A study sought to determine whether the method used to collect sperm from the proximal cauda epididymidis, where sperm are not completely mature, has a significant influence on sperm motion parameters. Two methods of collecting rat sperm for motion analysis were used: one based on an aspiration technique selected from the literature; the other, a new approach based on diffusion of sperm from the epididymal tubule. The two methods were tested for accuracy, precision and sensitivity of effects on sperm motility parameters 4 days after a single exposure to ethane dimethanesulphonate (EDS). The results of the study yielded strikingly different interpretations of the effect of a 65 mg/kg BW dose of EDS on the motility of sperm taken from the proximal cauda epididymidis. Statistical analyses indicate that the diffusion method of sperm collection provides enhanced precision and accuracy of the data, thereby decreasing the number of animals required in a treatment group to detect a statistically significant alteration of a sperm motion parameter.

Keywords: *Spermatozoa, *Sperm motility, *Toxicology, Reproduction(Biology), Testis, Epididymis, Rats, Statistical analysis, Reprints, *Sperm collection, *Ethane dimethanesulfonate.

PB91-207076/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Toxicological Screen to Determine in vitro Survival and Competition of Environmentally Applied Pseudomonads with Mouse Fecal Microbiota. Journal article.
Environmental Health Research and Testing, Inc., Research Triangle Park, NC.
G. M. Nelson, L. D. Claxton, J. P. Creason, and S. E. George. c1991, 14p EPA/600/J-91/114
Contract EPA-68-02-4456
Pub. in Environmental Toxicology and Chemistry, v10 p597-608 Apr 91. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

Engineered bacterial strains have been developed for a number of environmental uses including bioremediation and application as biopesticides. An in vitro system was developed to screen environmentally relevant microorganisms for their ability to colonize the mammalian intestinal tract and compete with the normal intestinal tract flora. Previous in vivo work examined the colonization and competition potential of Pseudomonas spp. isolated from a commercial product for PCB degradation with the intestinal flora of CD-1 mice. The study evaluated the same pseudomonads and additional Escherichia coli 'control' strains by an in vitro tier testing approach. Initially, the competitor strains were tested for their ability to survive in anaerobic pure culture. All strains tested survived for 48 hours in pure culture, and all survived for 24 hours in culture with the mouse fecal microbiota. The only consistent effect on the microbiota attributed to the addition of a competitor strain was the reduction of the obligately anaerobic Gram-negative bacilli by the mouse intestinal homogenate P. aeruginosa strain PAMG.

Keywords: *Toxicology, *Pseudomonas, *Escherichia coli, *Biological pest control, Feces, Health hazards, In vitro analysis, Survival, Risk assessment, Microbial colony count, Reprints, *Competitive colonization.

PB91-207084/REB PC **A03**/MF **A01**
Source-Receptor Study of Volatile Organic Compounds and Particulate Matter in the Kanawha Valley, WV. 1. Methods and Descriptive Statistics. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
M. A. Cohen, P. B. Ryan, J. D. Spengler, H. Oezkaynak, and C. Hayes. c1991, 17p EPA/600/J-91/115
Pub. in Atmospheric Environment, v25B n1 p79-93 1991. See also Part 2, PB91-207092. Prepared in cooperation with Harvard School of Public Health, Boston, MA., and Energy and Environmental Policy Center, Cambridge, MA.

The Kanawha Valley of West Virginia is a highly industrialized region stretching 100 km from Alloy in the southeast to Nitro in the north. The Valley which contains the state capital, Charleston, has a population of approximately 250,000 and is noted for its chemical manufacturing industry. The Valley itself is narrow and is steeply-walled. The combination of topography, local meteorological conditions, and the chemical industry potentiate elevated concentrations of volatile organic compounds (VOC) emitted within the region. An integrated approach designed to assess pollutant exposure in the region was implemented between April 1987 and March 1988. Data were collected simultaneously on volatile organic compound concentrations, particle pH, inorganic gases, and meteorological parameters. Data were collected using a mobile van sampling platform at one of the three within-valley sites for 15 days each month. A discussion of sampling methodology and statistics describing pollutant concentrations are presented in the paper. Concentrations of most pollutants were found to be in agreement with those found by other researchers, except during a period when a forest fire influenced the air quality. The results suggest that multivariate relationships may be

found that will be useful in source identification. (Copyright (c) 1991 Pergamon Press plc.)

Keywords: *Air pollution sampling, *Volatile organic compounds, *Air quality data, *Particles, *Kanawha Valley, West Virginia, Industrial wastes, Chemical industry, Site surveys, Air pollution effects(Humans), Pollution sources, Graphs(Charts), Tables(Data), Statistical analysis, Concentration(Composition), Data processing, Forest fires, pH, Meteorological data, Reprints.

PB91-207092/REB PC **A03**/MF **A01**
Source-Receptor Study of Volatile Organic Compounds and Particulate Matter in the Kanawha Valley, WV. 2. Analysis of Factors Contributing to VOC and Particle Exposures. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
M. A. Cohen, P. B. Ryan, J. D. Spengler, H. Oezkaynak, and C. Hayes. c1991, 15p EPA/600/J-91/116
Pub. in Atmospheric Environment, v25B n1 p95-107 1991. See also Part 1, PB91-207084. Prepared in cooperation with Harvard School of Public Health, Boston, MA., and Energy and Environmental Policy Center, Cambridge, MA.

The Kanawha Valley region of West Virginia includes a deep river valley with a large population living in close proximity to many potential sources of ambient volatile organics compounds (VOCs). The Valley runs approximately 100 km from Alloy to Nitro and is between 100 and 200 m deep. Nearly 250,000 people live in this section of the Valley, which includes the state capital of Charleston. Many large chemical manufacturing, transportation, and storage facilities are also located within the Valley's walls. The topography, population density, and locations of sources dictate the possibility of high population exposures. To investigate exposures to VOCs emitted by the local industry, simultaneous measurements of 19 VOCs, particle pH, particle elemental composition, inorganic gasses, and meteorological parameters were collected over an entire year. Sampling was performed in the Valley with a mobile van that collected samples for 15 days per month at one of three sites each month. Analysis reported in the work include simultaneous analysis of all data oriented towards source attribution. Results of factor analyses suggest auto-related sources, transported aerosol, chlorinated organic sources as well as site-specific sources and a single incident source - a forest fire. The techniques employed suggest that inclusion of VOC measurements increase the ability of such studies to identify pollutant sources. (Copyright (c) 1991 Pergamon Press plc.)

Keywords: *Air quality data, *Volatile organic compounds, *Particles, *Air pollution effects(Humans), *Kanawha Valley, *Emission factors, *Pollution sources, West Virginia, pH, Exposure, Biological effects, Population growth, Forest fires, Site surveys, Chemical industry, Industrial wastes, Meteorological data, Chemical composition, Air pollution sampling, Concentration(Composition), Reprints.

PB91-207118/REB PC **A03**/MF **A01**
Validation of Protocols for Assessing Early Pregnancy Failure in the Rat: Clomiphene Citrate. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
A. M. Cummings, S. D. Perreault, and S. T. Harris. c1991, 13p EPA/600/J-91/118
Pub. in Fundamental and Applied Toxicology 16, p506-516 Apr 91. Prepared in cooperation with NSI Technology Services Corp., Research Triangle Park, NC.

Following the assembly of a battery of protocols for the assessment of maternally-mediated toxicity during early pregnancy, the validation of the battery for its utility in detecting and defining mechanisms of early pregnancy failure is ongoing. The report describes the use of clomiphene citrate (CC), an estrogen agonist/antagonist, in these protocols as part of the validation process. The several protocols involve dosing rats with CC during and evaluation of multiple endpoints following (1) the first 8 days of pregnancy; (2) early pseudopregnancy, accompanied by decidual induction; and (3) the pre- and post implantation intervals of early pregnancy. In addition, the effect of CC on embryo transport rate was assessed. The data suggest a direct effect of CC on the embryo or on its ability to implant as the primary mechanism mediating CC-induced early pregnancy failure. The battery of protocols was thus successful in identifying CC as a reproductive toxicant and in elucidating the causes of the observed early pregnancy failure.

Keywords: *Spontaneous abortion, *Clomiphene, *Toxicology, *Reproduction(Biology), Estrogen antagonists, Clinical trials, Animal disease models, Embryo transfer, Ovum implantation, Dose-response relationships, Corpus luteum, Reprints.

PB91-210732/REB PC **E99**/MF **E99**
Volunteer Lake Monitoring Program, 1990.
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
Apr 91, 612p-in 7v
Set includes PB91-210740 through PB91-210807.

No abstract available.

PB91-210740/REB PC **A06**/MF **A01**
Volunteer Lake Monitoring Program, 1990. Volume 1. Statewide Summary Report. Annual rept.
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
A. J. Burns. Apr 91, 116p IEPA/WPC/91-61A
See also PB90-220393 and Volume 2, PB91-210757.Color illustrations reproduced in black and white.
Also available in set of 7 reports PC E99/MF E99, PB91-210732.

A Volunteer Lake Monitoring Program initiated by the Illinois EPA in 1981 was continued in 1990. Citizens were trained to measure Secchi disc transparency, total depth, and record field observations from a boat at designated sites on their chosen lake. Readings were to be taken at least twice a month from May through October, and the results forwarded to the Agency. In addition, volunteers for 49 lakes collected water samples for analysis of nutrients and suspended solids when performing the Secchi monitoring. The report provides a historical perspective of the Volunteer Lake Monitoring Program and describes program objectives and rationale. Methods for volunteer training and data handling/analysis are described; 1990 program results presented and discussed; and trends analyzed.

Keywords: *Illinois, *Lakes, *Water pollution sampling, *Environmental monitoring, *Water quality data, Environmental Protection Agency, Volunteers, State programs, Depth, Field tests, Nutrients, Suspended solids, Transparence, Tables(Data), Water quality management, Eutrophication, Citizen participation, *Volunteer Lake Monitoring Program, Secchi disc transparency.

PB91-210757/REB PC **A03**/MF **A01**
Volunteer Lake Monitoring Program, 1990. Volume 2. Northwestern Illinois Region. Annual rept.
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
A. J. Burns. Apr 91, 47p IEPA/WPC/91-61B
See also PB90-220401, Volume 1, PB91-210740, and Volume 3, PB91-210765.
Also available in set of 7 reports PC E99/MF E99, PB91-210732.

The report is Vol. II of a series of 7 reports summarizing Illinois EPA's 1990 Volunteer Lake Monitoring Program (VLMP). It provides a summary of 1990 VLMP lakes in Northwestern Illinois a program overview, volunteer participation, and a ranking of lakes on a regional basis. Thirty volunteers recorded total depth, Secchi disc transparency, and field observations for 19 lakes in Northwestern Illinois between May and October, 1990. Average transparencies ranged from 12-109 inches. Volunteer water quality samples were collected at 9 lakes once every month from May thru October and ambient lake data, collected by IEPA staff, is presented for 2 lakes.

Keywords: *Water quality data, *Environmental monitoring, *Water pollution sampling, *Lakes, Volunteers, Citizen participation, Illinois, Regional analysis, Environmental Protection Agency, Transparence, Field tests, Ranking, Graphs(Charts), Tables(Data), State programs, Water quality management, *Northwest Region(Illinois), *Volunteer Lake Monitoring Program, Secchi Disc Transparency.

PB91-210765/REB PC **A08**/MF **A01**
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
Volunteer Lake Monitoring Program, 1990. Volume 3. Northeastern Illinois Region. Annual rept.
Northeastern Illinois Planning Commission, Chicago.
H. L. Hudson, and R. J. Hirschner. Apr 91, 163p IEPA/WPC-91-61C
See also PB90-220419, Volume 2, PB91-210757, and Volume 4, PB91-210773. Sponsored by Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
Also available in set of 7 reports PC E99/MF E99, PB91-210732.

The Illinois Environmental Protection Agency initiated the Volunteer Lake Monitoring Program (VLMP) in 1981 as a result of growing public interest in lakes and the need to expand the state's data base on lake water quality. The purpose of the VLMP is to involve volunteers with lake monitoring, thereby providing effective public education in lake ecology and management as well as a useful data base for site-specific and statewide lake quality assessment. The Regional Report volume is a compilation of lake monitoring data for 40 lakes in the Northeastern Illinois Region. A regional lake location map is shown in Figure 1 and a ranking of lakes by average transparency are contained in the section. Section II contains lake data and individual lake summaries for those VLMP lakes monitored during nine or more semi-monthly sampling periods in the 1990 season. Section III includes lake data for those VLMP lakes monitored during four to nine of the semi-monthly sampling periods. Data collected under IEPA's Ambient Lake Monitoring Program (ALMP) in 1990 also is included where available. Discussions of the chemical parameters included in water quality data found in Sections II and III are provided in the Appendix.

Keywords: *Water quality data, *Water pollution sampling, *Lakes, *Environmental monitoring, Illinois, Ranking, Environmental Protective Agency, State programs, Regional analysis, Water quality management, Transparence, Field tests, Maps, Graphs(Charts), Tables(Data), Volunteers, Citizen participation, *Northeast Region(Illinois), *Volunteer Lake Monitoring Program, Secchi disc transparency.

PB91-210773/REB PC **A04**/MF **A01**
Volunteer Lake Monitoring Program, 1990. Volume 4. West-Central Illinois Region. Annual rept.
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
A. J. Burns. Apr 91, 60p IEPA/WPC/91-61D
See also PB90-220427, Volume 3, PB91-210765, and Volume 5, PB91-210781.
Also available in set of 7 reports PC E99/MF E99, PB91-210732.

The report is Vol. IV of a series of 7 reports summarizing Illinois EPA's 1990 Illinois Volunteer Lake Monitoring Program (VLMP). It provides a summary of 1990 VLMP lakes in West-Central Illinois a program overview, volunteer participation, and a ranking of lakes on a regional basis. Forty-four volunteers recorded total depth, Secchi disc transparency, and field observations for 21 lakes in West-Central Illinois between May and October, 1990. Average transparencies ranged from 7-89 inches. Volunteer water quality samples were collected at 8 lakes once every month from May thru October and ambient lake data, collected by IEPA staff, is presented for 5 lakes.

Keywords: *Water quality data, *Water pollution sampling, *Lakes, *Environmental monitoring, Environmental Protection Agency, Illinois, State programs, Regional analysis, Ranking, Graphs(Charts), Tables(Data), Water quality management, Transparence, Volunteers, Field tests, Citizen participation, *Westcentral Region(Illinois), *Volunteer Lake Monitoring Program, Secchi disc transparency.

PB91-210781/REB PC **A04**/MF **A01**
Volunteer Lake Monitoring Program, 1990. Volume 5. East-Central Illinois Region. Annual rept.
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
A. J. Burns. Apr 91, 72p IEPA/WPC/91-61E
See also PB90-220435, Volume 4, PB91-210773, and Volume 6, PB91-210799.

Also available in set of 7 reports PC E99/MF E99, PB91-210732.

The report is Vol. V of a series of 7 reports summarizing Illinois EPA's 1990 Illinois Volunteer Lake Monitoring Program (VLMP). It provides a program overview, summary of 1990 VLMP lakes in East-Central Illinois volunteer participation and a ranking of lakes on a regional basis. Fifty-eight volunteers recorded total depth, Secchi disc transparency, and field observations for 28 lakes in East-Central Illinois between May and October, 1990. Average transparencies ranged from 9-105 inches. Volunteer water quality samples were collected at 9 lakes once every month from May thru October and ambient lake data, collected by IEPA staff, is presented for five lakes.

Keywords: *Water quality data, *Water pollution sampling, *Lakes, *Environmental monitoring, Volunteers, Depth, Field tests, Water quality management, Environmental Protection Agency, Illinois, Transparence, State programs, Tables(Data), Graphs(Charts), Ranking, Citizen participation, *Eastcentral Region(Illinois), *Volunteer Lake Monitoring Program, Secchi disc transparency.

PB91-210799/REB PC **A05**/MF **A01**
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
Volunteer Lake Monitoring Program, 1990. Volume 6. Southwestern Illinois Region. Annual rept.
Southwestern Illinois Metropolitan and Regional Planning Commission, Collinsville.
A. W. Mitchell. Apr 91, 91p SWIL-MAPC-91-01, IEPA/WPC-91-61F
See also PB90-226671, Volume 5, PB91-210781, and Volume 7, PB91-210807. Sponsored by Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
Also available in set of 7 reports PC E99/MF E99, PB91-210732.

A Volunteer Lake Monitoring Program initiated by Illinois EPA in 1981 was continued through 1991. Citizens were trained to measure Secchi disc transparency, total depth, and record field observations from a boat at three sites on their chosen lake, twice per month from May through October. The report provides a summary of the 1990 program conducted in the Southwestern Illinois Region. Nineteen volunteers participated in monitiring thirteen lakes. Regional results are analyzed and compared with statewide results. Individual lake summaries are provided for lakes sampled six or more periods during the season, and data is provided for lakes sampled by the Illinois EPA under the Ambient Lake Monitoring Program.

Keywords: *Water quality data, *Water pollution sampling, *Lakes, *Environmental monitoring, Illinois, State programs, Volunteers, Regional analysis, Depth, Field tests, Seasonal variation, Transparence, Environmental Protection Agency, Water quality management, Graphs(Charts), Tables(Data), Citizen participation, *Volunteer Lake Monitoring Program, *Southwest Region(Illinois), Secchi disc transparency.

PB91-210807/REB PC **A04**/MF **A01**
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
Volunteer Lake Monitoring Program, 1990. Volume 7. Southern Illinois Region. Annual rept.
Greater Egypt Regional Planning and Development Commission, Carbondale, IL.
D. B. Muir. Apr 91, 63p IEPA/WPC-91-61G
See also PB90-226689 and Volume 6, PB91-210799. Sponsored by Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
Also available in set of 7 reports PC E99/MF E99, PB91-210732.

The Illinois Environmental Protection Agency initiated the Illinois Volunteer Lake Monitoring Program (VLMP) in 1981 as a result of growing public interest in lakes and the need to expand the state's data base on lake water quality. The purpose of the VLMP is to involve volunteers with lake monitoring, thereby providing effective public education in lake ecology and management as well as a useful data base for site-specific and statewide lake quality assessment. The Regional Report volume is a compilation of lake monitoring data for lakes in the southern Illinois region. A regional lake location map and a ranking of lakes by average transparency is discussed in the section. Section II contains lake data and individual lake summaries for those VLMP lakes that were monitored during nine or more semi-monthly sampling periods in the 1990 season. Section III includes lake data for those VLMP lakes that were monitored during four to nine of the semi-monthly sampling periods. Data collected under IEPA's Ambient Lake Monitoring Program in 1989 is also included where available.

Keywords: *Water quality data, *Water pollution sampling, *Lakes, *Environmental monitoring, Citizen participation, Illinois, State programs, Regional analysis, Maps, Water quality management, Environmental Protection Agency, Transparence, Tables(Data), Graphs(Charts), Ranking, Volunteers, Field tests, *Volunteer Lake Monitoring Program, *Southern Region(Illinois), Secchi disc transparency.

PB91-211318/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
EPA/AWWARF Cooperative Agreement Program for Drinking Water Research. Final rept.
American Water Works Association Research Foundation, Denver, CO.
Jun 91, 26p EPA/600/9-91/021
Grant EPA-R-811335
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Beginning in 1984 and continuing in 1985 and 1986, Congress agreed to support a joint research program and approved adding $1 million to the EPA annual budget for the purpose of establishing a cooperative agreement (CA) with the American Water Works Association Research Foundation (AWWARF). The report describes the results of the joint industry-EPA research program including the administration of the cooperative agreement, selection and management of projects, and benefits realized by both organizations. A unique component of the cooperative agreement projects is that water utilities were involved in the actual research whenever possible to ensure practical research and to maximize the transfer of technology from the laboratory to the operational arena.

Keywords: *Potable water, *Research and development, *Water treatment, *Water pollution control, US EPA, Administrative procedures, Management planning, Decision making, Technology transfer, Water resources, Water management(Applied), Water analysis, Grants, Comprehensive planning, *Cooperative agreements, American Water Works Association Research Foundation.

PB91-211326/REB PC **A03**/MF **A01**
Summer 1990 Atlanta Ozone Precursor Study.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
L. J. Purdue. 19 Jun 91, 17p EPA/600/D-91/119
Presented at the Annual Meeting and Exhibition of the Air and Management Waste Association (84th), Vancouver, British Columbia, Canada, June 19, 1991.

The U.S. Environmental Protection Agency conducted a major monitoring project in Atlanta, Georgia during the summer of 1990 to obtain an information base for the development of guidance addressing the reduction of ozone in cities currently out of compliance with the National Ambient Air Quality Standards (NAAQS) for ozone. The specific objective of the study was to obtain a comprehensive data base of ambient concentrations of ozone and ozone precursors during the 1990 summer ozone season at six sites distributed across the Atlanta urban area. The data base has been and will continue to be used to address a number of questions relating to spatial and temporal variations in the concentrations of these pollutants and pollutant ratios, questions about the adequacy of precursor monitoring requirements for air quality models, and the accuracy of pollutant emission data used in these models. The objectives, approach, and design of the primary study will be described and brief descriptions of several ancillary experiments will be presented.

Keywords: *Ozone, *Air pollution monitoring, Data acquisition, Air quality, Standards, Meteorological data, Urban areas, Summer, *Ozone precursors, *Atlanta(Georgia).

PB91-211334/REB PC **A03**/MF **A01**
Natural Emissions of Oxidant Precursors. Interim rept. Jan 90-May 91.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
J. H. Novak, and T. E. Pierce. 1991, 25p EPA/600/D-91/120
Presented at the Symposium on the Role and Importance of Nitrogen Oxide Emissions Controls in Ozone Attainment Strategies for Eastern North America, Cambridge, MA., May 30-June 1, 1990. Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div.

The paper provides an overview of the sources, the estimation methodology, and the relative amounts of natural hydrocarbon and nitrogen oxide emissions. The most recent estimate of natural nonmethane hydrocarbon (NMHC) emissions for the United States is 28 teragrams per year (Tg/yr). This compares with 20 Tg/yr for anthropogenic NMHC sources. The southeastern and southcentral portions of the United States account for approximately 43% of the annual U.S. natural NMHC estimate. These emissions exhibit strong diurnal and seasonal dependencies related to temperature, solar radiation, and active biomass. Forests are the primary vegetative source of hydrocarbons. The major sources of natural nitrogen oxide emissions in North America are biomass burning, lightning, and microbial activity in soil. The authors present a comparison of hourly gridded nitrogen oxide emissions from lightning, soil, and man-made sources for the northeastern United States. They also provide results from preliminary investigations of the sensitivity of ozone predictions from the U.S. Environmental Protection Agency's Regional Oxidant Model to natural NMHC and nitric oxide emissions.

Keywords: *Hydrocarbons, *Nitrogen oxides, *Natural emissions, *Emission factors, *Air pollution monitoring, *United States, Sources, Forests, Biomass, Combustion, Soils, Bacteria, Reviews, Ozone, Seasonal variations, Diurnal variations, Lightning, Solar radiation, Northeastern Region(United States).

PB91-211342/REB PC **A03**/MF **A01**
Workplace Characteristics Associated with Health and Comfort Concerns in Three Office Buildings in Washington, DC.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
L. A. Wallace, C. J. Nelson, and G. Dunteman. 1991, 11p EPA/600/D-91/121

Nearly 4000 employees of a Federal Agency in Washington, DC were surveyed in March of 1989 to determine their health symptoms, comfort concerns, and reports of odor during the previous year. Their personal characteristics and perceptions of workplace conditions were also determined. A multivariate regression analysis indicated that the workplace variable affecting the largest number of health symptoms and comfort/odor concerns was dust. Perceptions of hot stuffy air and the odor of paint, carpet cleaning, and other chemicals were also associated with a number of health symptoms. Other workplace variables associated with comfort and odor concerns included glare, noise, and nearby water leaks. In most cases, individual air handling units could not be associated with health symptoms. Areas with new carpet reported higher frequency of throat problems. It was concluded that improved maintenance, better recirculation and filtration of air, and glare screens were desirable to improve employee health and productivity.

Keywords: *Occupational safety and health, *Industrial medicine, *Environmental surveys, *Federal buildings, *Working conditions, Occupational exposure, Odors, Indoor air pollution, Air pollution effects(Humans), Ventilation, Office building, District of Columbia, Chemical compounds, Painting, Inhalation.

PB91-211359/REB PC **A02**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Allyl Chloride: The Mutagenic Activity of Its Photooxidation Products. Journal article.
Northrop Services, Inc./Environmental Sciences, Research Triangle Park, NC.

P. B. Shepson, T. E. Kleindienst, C. M. Nero, D. N. Hodges, and L. T. Cupitt. c1987, 8p EPA/600/J-87/548
Contract EPA-68-02-4033
Pub. in Environmental Science and Technology, v21 n6 p568-576 Jun 87. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

Irradiations of C3H5Cl/NOx, C3H5Cl/C2H6/NOx, and C2H6/NOx mixtures were conducted in a 22.7 cu m Teflon smog chamber, operated in a static mode. The irradiated mixtures were tested for mutagenic activity by periodically exposing Salmonella typhimurium strain TA100 to the smog chamber effluent during the irradiation. The allyl chloride photooxidation products' total mutagenic activity was found to be dramatically dependent onthe presence of Cl atom reaction products. In the absence of C2H6, which is used as a Cl atom scavenger, the observed mutagenic activity of the irradiated C3H5Cl/NOx mixture at long extent of reaction was 13 revertants per plate per hour/(ppb C3H5Cl consumed). However, when sufficient C2H6 was present to remove all Cl atoms, the observed mutagenic activity for C3H5Cl photooxidation products was 1.4 revertants per plate per hour/(ppb C3H5Cl consumed). Under conditions of excess C2H6, the mixture is approximately 30 times more mutagenic than that previously observed for the mutagenic activity of the photooxidation products of propylene, the nonchlorinated analogue of allyl chloride. The observed mutagenic activity in the presence of excess C2H6 is consistent with the total response caused by chloroacetaldehyde, a primary C3H5Cl photooxidation product. (Copyright (c) 1987 by the American Chemical Society.)

Keywords: *Photochemistry, *Oxidation, *Allyl chloride, *Mutagens, Salmonella typhimurium, Smog, Kinetics, Bioassay, Nitrogen oxides, Reprints.

PB91-211367/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Testing and Validation of a Multiple Nonlinear Regression Model for Predicting Trihalomethane Formation Potential. Journal article.
Florida International Univ., Miami. Drinking Water Research Center.
G. L. Amy, R. A. Minear, and W. J. Cooper. c1987, 14p EPA/600/J-87/549
Grants EPA-R-810277-01, EPA-R-809935-01
Pub. in Water Research, v21 n6 p649-659 1987. Prepared in cooperation with Arizona Univ., Tucson. Dept. of Civil Engineering, and Illinois Univ. at Urbana-Champaign. Inst. for Environmental Studies. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The paper summarizes a testing and validation analysis of a previously developed model for predicting trihalomethane formation potential (THMFP) in chlorinated waters containing THM precursors. The original model, in the form of a nonlinear multiple regression equation, tended to overpredict THM formation potential at lower chlorine concentrations and underpredict at higher chlorine concentrations. The model proved to be more accurate in simulating THM formation potential in waters with moderate levels of organic carbon/THM precursors. While the model did not provide a high degree of predictive accuracy, the general format of the nonlinear model represents a rational framework for developing source specific models applicable to a given water source. (Copyright (c) 1987 Pergamon Journals Ltd.)

Keywords: *Chlorination, *Water, *Halohydrocarbons, *Chemical reactions, Models, Regression analysis, Temperature, pH, Ultraviolet spectroscopy, Reprints, *Trihalomethanes.

PB91-211375/REB PC **A03/MF A01**
Development of Cost Equations for GAC Treatment Systems (Paper 22509). Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
J. Q. Adams, and R. M. Clark. c1988, 19p EPA/600/J-88/572
Pub. in Jnl. of Environmental Engineering, v114 n3 p672-688 Jun 88.

The use of granular activated carbon (GAC) as a broad spectrum adsorbant in the treatment of drinking water has been shown to be effective in removing or reducing concentrations of specific organics and toxic organic chemicals. Much concern has been expressed regarding the cost of GAC systems. Several studies have been conducted to develop cost estimating equations for the system components. Comparisons between some of the costs from field studies and costs estimated from these equations have resulted in substantially different values although most cost estimates were very close to the actual costs derived from the field studies. Data from a series of field research projects have been combined with the earlier cost equation development efforts to derive a new set of cost estimating equations for GAC. These new equations can be used to estimate capital costs and individual O&M cost components.

Keywords: *Activated carbon treatment, *Water treatment, *Cost analysis, *Water pollution control, Potable water, Adsorption, Cost comparison, Cost estimates, Reprints, *Granular activated carbon.

PB91-211383/REB PC **A03/MF A01**
Critical Review of the Developmental Toxicity and Teratogenicity of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin: Recent Advances Toward Understanding the Mechanism. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
L. A. Couture, B. D. Abbott, and L. S. Birnbaum. c1990, 11p EPA/600/J-90/521
Pub. in Teratology, v42 n6 p619-627 1990. Prepared in cooperation with National Inst. of Environmental Health Sciences, Research Triangle Park, NC., and North Carolina Univ. at Chapel Hill.

A specific teratogenic response is elicited in the mouse as a result of exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD; dioxin). The characteristic spectrum of structural malformations induced in mice following exposure to TCDD and structurally-related congeners is highly reproducible and includes both hydronephrosis and cleft palate. In addition, prenatal exposure to TCDD has been shown to induce thymic hypoplasia. The three abnormalities occur at doses well below those producing maternal or embryo/fetal toxicity, and are among the most sensitive indicators of dioxin toxicity. In all other laboratory species tested, TCDD causes maternal and embryo/fetal toxicity, but does not induce a significant increase in the incidence of structural abnormalities even at toxic dose levels. Developmental toxicity occurs in a similar dose range across species, however, mice are particularly susceptible to development of TCDD-induced terata. Recent experiments using an organ culture were an attempt to address the issue of species and organ differences in sensitivity to TCDD. Human palatal shelves were examined in this in vitro system, and were found to approximate the rat in terms of sensitivity for induction of cleft palate. (Copyright (c) 1990 Wiley-Liss, Inc.)

Keywords: *Toxicology, *Teratogens, *Tetrachlorodibenzodioxins, Maternal-fetal exchange, Species specificity, Rats, Mice, Abnormalities, Reprints.

PB91-211391/REB PC **A02/MF A01**
Systemic Administration of Kainic Acid Increases GABA Levels in Perfusate from the Hippocampus of Rats 'In vivo'. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
W. Q. Zhang, B. C. Rogers, P. Tandon, P. M. Hudson, and T. J. Sobotka. c1990, 10p EPA/600/J-90/522
Pub. in NeuroToxicology, v11 n4 p593-600 1990. Prepared in cooperation with National Inst. of Environmental Health Sciences, Research Triangle Park, NC. Lab. of Molecular and Integrative Neuroscience, and Food and Drug Administration, Rockville, MD.

The ventral hippocampi of male, Fischer-344 rats were implanted with microdialysis probes and the effects of systemically administered kainic acid (KA) (8 mg/kg, s.c.) on the in vivo release of amino acids were measured for four hours after administration. In order to measure GABA release in vivo, gamma-vinyl-GABA (GVG), an irreversible inhibitor of GABA transaminase, was injected intrahippocampally prior to perfusion. GVG pretreatment resulted in measurable levels of GABA in the perfusate without significant effects on the release of aspartate, glutamate, glutamine, glycine or taurine. Following GVG pretreatment systemic administration of KA produced a time-dependent increase in GABA, as well as all other amino acids except glutamine, which was initially decreased. The results show for the first time that systemically administered KA increases extracellular GABA levels, an effect previously reported only in vitro. The data suggest that prior to destruction of GABA-containing interneurons in the hippocampus, there is an increased activity of those GABA interneurons reflected as an increase in extracellular GABA levels. (Copyright (c) 1990 by Intox Press, Inc.)

Keywords: *Kainic acid, *Pharmacology, *GABA, *Hippocampus, In vivo analysis, Aspartate, Rats, Glutamate, Glutamine, Glycine, Taurine, Nerve cells, Dose-response relationships, Reprints.

PB91-211409/REB PC **A02/MF A01**
Health Effects Research Lab., Research Triangle Park, NC.
Dose-Dependent Effect of Prenatal Dexamethasone Treatment on beta-Adrenergic Receptor Coupling to Ornithine Decarboxylase and Cyclic AMP. Journal article.
Duke Univ. Medical Center, Durham, NC. Dept. of Pharmacology.
X. P. Bian, F. J. Seidler, J. Bartolome, R. J. Kavlock, and M. Bartolome. c1990, 8p EPA/600/J-90/523
Grants EPA-R-813769, PHS-HD-09713
Pub. in Jnl. of Developmental Physiology, v14 p125-130 Dec 90. Sponsored by Health Effects Research Lab., Research Triangle Park, NC., and Public Health Service, Rockville, MD.

Glucocorticoids regulate the coupling of beta-adrenergic receptors to cell function. In the current study, the potential role of these agents in the development of adrenergic responses was evaluated in the offspring of pregnant rats given 0.8 mg/kg of dexamethasone on gestational days 17, 18 and 19. The authors examined the postnatal development of beta-receptors coupling to ornithine decarboxylase in heart and kidney throughout neonatal life into young adulthood; this enzyme is involved in transduction of neural signals controlling cellular replication and differentiation. Dexamethasone exposure perturbed the basal pattern of cardiac ornithine decarboxylase activity and attenuated the response of the enzyme in both heart and kidney to acute challenge with the beta-agonist, isoproterenol. Subsensitivity persisted into the postweaning period. This dosage regimen of dexamethasone also suppressed renal cyclic AMP responses to isoproterenol, but exposure to a lower dose (0.2 mg/kg) enhanced the response. Thus, although low doses of glucocorticoids foster development of the coupling of beta-receptors to cellular transduction mechanisms, higher doses such as those used to stimulate lung function may lastingly obtund adrenergic sensitivity.

Keywords: *Dexamethasone, *Beta adrenergic receptors, *Adenosine cyclic monophosphate, *Ornithine decarboxylase, Heart, Kidney, Isoproterenol, Animal pregnancy, Rats, Dose-response relationships, Reprints.

PB91-211417/REB PC **A02/MF A01**
Environmental Research Lab.-Duluth, MN.
Variable Selectivity and the Role of Nutritional Quality in Food Selection by a Planktonic Rotifer. Journal article.
Wisconsin Univ.-Madison. Center for Limnology.
M. E. Sierszen. c1990, 8p EPA/600/J-90/524
Grant EPA-R-812216-01
Pub. in OIKOS 59, p241-247 Jun 90. Sponsored by Environmental Research Lab.-Duluth, MN.

To investigate the potential for selective feeding to enhance fitness, the hypothesis that an herbivorous zooplankter selects those food items that best support its reproduction was tested. Under the hypothesis, growth and reproduction on selected food items should be higher than on less preferred items. The hypothesis is not supported. In situ selectivity by the rotifer Keratella taurocephala for Cryptomonas relative to Chlamydomonas goes through a seasonal cycle, in apparent response to fluctuating Cryptomonas populations. However, reproduction on a unialgal diet of Cryptomonas is consistently high and similar to that on Chlamydomonas. Oocystis, which also supports reproduction equivalent to that supported by Chlamydomonas, is sometimes rejected by K. taurocephala. In addition, K. taurocephala does not discriminate between Merismopedia and Chlamydomonas even though Merismopedia supports virtually no reproduction by the rotifer. Selection by K. taurocephala does not simply maximize the intake of food items that yield high reproduction. Selectivity is a complex, dynamic process, one func-

tion of which may be the exploitation of locally or seasonally abundant foods.

Keywords: *Zooplankton, *Food chains, *Nutrition, Reproduction(Biology), Seasonal variations, Algae, Field tests, Mortality, Chlamydomonas, Reprints, *Rotifers, Keratella taurocephala, Merismopedia, Cryptomonas.

PB91-211425/REB PC **A01**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Characterization of an Axenic Strain of 'Hartmannella vermiformis' Obtained from an Investigation of Nosocomial Legionellosis. Journal article.
Center for Infectious Diseases, Atlanta, GA. Div. of Bacterial Diseases.
B. S. Fields, T. A. Nerad, T. K. Sawyer, C. H. King, and J. M. Barbaree. c1990, 5p EPA/600/J-90/525
Grant EPA-R-816070-01-0
Pub. in Jnl. of Protozoology, v37 n6 p581-583 Nov/Dec 90. Prepared in cooperation with American Type Culture Collection, Rockville, MD., Rescon Associates, Inc., Royal Oak, MD., and Georgia Univ., Athens. Coll. of Veterinary Medicine. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A free living amoeba identified as Hartmannella vermiformis was isolated from a water sample obtained during an investigation of nosocomial legionellosis. Hartmannella vermiformis are known to support the intracellular multiplication of Legionella pneumophila. This strain of H. vermiformis, designed CDC-19, was cloned and established in axenic culture, in order to develop a model for the study of the pathogenicity of legionellae. Isoenzyme patterns of axenically cultivated strain CDC-19 were compared with 2 strains of H. vermiformis derived from the type strain, one axenic (ATCC 50236) and the other grown in the presence of bacteria (ATCC 30966). Enzyme patterns suggested that all 3 strains are assignable to the species Hartmannella vermiformis. Axenic H. vermiformis strain CDC-19 has been deposited with the American Type Culture Collection (ATCC 50237) and should prove useful in the study of protozoan-bacterial interaction. (Copyright (c) 1990 American Society of Protozoologists.)

Keywords: *Hartmanella, *Cross infections, *Legionellosis, Legionella, Isoenzymes, Water microbiology, Polyacrylamide gel electrophoresis, Reprints, *Protozoan-bacterial interactions.

PB91-211433/REB PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Influence of Temperature during Electric- and Magnetic-Field-Induced Alteration of Calcium-Ion Release from In vitro Brain Tissue. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
C. F. Blackman, S. G. Benane, and D. E. House. 1991, 11p EPA/600/J-91/120
Contract DE-AI01-89CE34024
Pub. in Bioelectromagnetics, v12 n3 p173-182 May 91. Sponsored by Department of Energy, Washington, DC.

A technique based on release of calcium ions from in vitro preparations of avian brain tissues has been used by several investigators to demonstrate a biological effect of weak electric and magnetic fields. When the tissues have been exposed to ELF-modulated, VHF and UHF fields, enhanced release of calcium ions has resulted. Both inhibition and enhancement in release of calcium ions have been reported. Avian-brain tissues were exposed to 16-Hz sinusoidal electromagnetic fields at 14.1 V(sub rms)/m (in air) and 64 nTrms. During 20-min exposures, as tissue-sample temperature rose by 0.7 to 2.5 C to a temperature of 35, 36, or 37, but not of 38 or 39 C, an enhanced release of ions was observed. When the temperature was stable during exposure (i.e., constant within + or - 0.3 C) at a final value of 36 or 37, but not of 35 or 38 C, the quantity of ions released was reduced. And when descending by 0.7 to 1.5 C to any final temperature from 35 to 38 C, a null result occurred. These findings may reconcile the apparent disagreement in the direction of a field-induced response, and they may explain why experimental outcomes have been difficult to confirm in some laboratories. Of greater importance, the findings may also provide insight into the mechanism of the field-induced phenomenon.

Keywords: *Electric fields, *Magnetic fields, *Temperature, *Brain, *Calcium, In vitro analysis, Frequencies, Chickens, Reprints.

PB91-211441/REB PC **A03**/MF **A01**
North Carolina Univ. at Chapel Hill.
Hydronephrosis in Mice Exposed to TCDD-Contaminated Breast Milk: Identification of the Peak Period of Sensitivity and Assessment of Potential Recovery. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
L. Couture-Haws, M. W. Harris, M. M. McDonald, A. C. Lockhart, and L. S. Birnbaum. c1991, 18p EPA/600/J-91/121
Pub. in Toxicology and Applied Pharmacology, v107 n2 p413-428 1991. Prepared in cooperation with National Inst. of Environmental Health Sciences, Research Triangle Park, NC. Sponsored by North Carolina Univ. at Chapel Hill, and Computer Sciences Corp., Research Triangle Park, NC.

2, 3, 7, 8-tetrachlorodibenzo-p-dioxin (TCDD) is a potent inducer of hydronephrosis in mice both pre- and post-natally. To identify the critical period of susceptibility for development of TCDD-induced hydronephrosis in neonatal mice, as well as to characterize the potential for recovery from this renal lesion, dose-response and time-course studies were conducted using lactational exposure. Pregnant C57BL/6N mice were allowed natural delivery. In the dose-response phase of the investigation, mothers were administered 0, 3, 6, or 12 microgram TCDD/kg once by gavage on post natal day (pnd) 1, 4, 8, or 14, and dams and pups were sacrificed on pnd 26. In the time-course studies, dams were given a single oral dose of 0 or 9 microgram TCDD/kg on pnd 1, and mothers and litters were subsequently sacrificed on pnd 7, 13, 19, or 26. Neonatal kidneys were examined, and hydronephrotic severity was scored. The incidence and severity of hydronephrosis were significantly elevated above controls at all dose levels on pnd 26 following treatment on pnds 1 and 4, while treatment on pnd 8 or 14 was ineffective at inducing hydronephrosis.

Keywords: *Tetrachlorodibenzodioxin, *Kidney diseases, *Milk, Mammae, Maternal-fetal exchange, Dose-response relationships, Newborn animals, Mice, Sex factors, Food contamination, Organ weight, Body weight, Liver, Thymus gland, Pathology, Reprints.

PB91-211458/REB PC **A03**/MF **A01**
Activity Profiles of Developmental Toxicity: Design Considerations and Pilot Implementation. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
R. J. Kavlock, J. A. Greene, G. L. Kimmel, R. E. Morrissey, and E. Owens. c1991, 30p EPA/600/J-91/122
Pub. in Teratology, v43 n2 p159-185 Feb 91. Prepared in cooperation with Burroughs Wellcome Co., Research Triangle Park, NC., Environmental Health Research and Testing, Inc., Research Triangle Park, NC., Chemical Industry Inst. of Toxicology, Research Triangle Park, NC., and North Carolina Univ. at Chapel Hill.

The available literature was searched for quantitative test results from both in vitro and in vivo assays for developmental toxicity for five model compounds: cyclophosphamide, methotrexate, hydroxyurea, caffeine, and ethylenethiourea. Nine cellular-based assays, six assays using whole embryos in culture, as well as Segment II and abbreviated exposure tests for mammalian test species are included in the database. For each assay, the critical endpoints were identified, each of which was then provided a three-letter code, and the criteria for extraction of quantitative information were established. The extracted information was placed into a computerized reference file and subsequently plotted such that the qualitative (positive/negative) and quantitative (e.g., IC(sub 50), highest ineffective dose (HID), lowest effective dose (LED)) results across all test systems could be displayed. The information contained in these profiles can be used to compare qualitative and quantitative results across multiple assay systems, to identify data gaps in the literature, to evaluate the concordance of the assays, to calculate relative potencies, and to examine structure-activity relationships.

Keywords: *Toxicology, *Teratogens, Cyclophosphamide, Methotrexate, Hydroxyurea, Caffeine, Ethylenethiourea, Dose-response relationships, Structure-activity relationships, Data bases, Mutagenicity tests, Mammals, Reprints.

PB91-211466/REB PC **A03**/MF **A01**
Disposition and Excretion of Intravenous 2,3,7,8-Tetrabromodibenzo-p-dioxin (TBDD) in Rats. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
L. B. Kedderis, J. J. Diliberto, and L. S. Birnbaum. c1991, 12p EPA/600/J-91/123
Pub. in Toxicology and Applied Pharmacology, v108 n2 p397-406 May 91. Presented at the Annual Society of Toxicology Meeting, Miami Beach, FL., February 1990. Prepared in cooperation with National Inst. of Environmental Health Sciences, Research Triangle Park, NC., and North Carolina Univ. at Chapel Hill.

Polybrominated dibenzodioxins and dibenzofurans are of toxicologic interest due to potential occupational and environmental exposure and because of their structural similarity to the highly toxic chlorinated analogues. The excretion and terminal tissue distribution of (3)H-TBDD was studied in male F344 rats for 56 days following single doses of 0, 0.001 or 0.1 micro mol/kg. The major tissue depots of radioactivity in liver, adipose, and skin, and tissue distribution was dose-dependent. At 56 days, liver concentrations in the high dose group were disproportionately increased compared to the low dose group. Liver:adipose concentration ratios were 0.2 and 2.6 at the low and high doses, respectively. Elimination of radioactivity in the feces, the major route of excretion, and urine was also nonlinear with respect to dose. By day 56, feces accounted for approximately 50% of the administered dose at the low dose versus 70% at the high dose. Blood levels of radioactivity declined rapidly with approximately 2% remaining in the blood by 24 hours. Radioactivity levels in the liver peaked by 7 hrs and then gradually declined concomitant with a slow accumulation in adipose tissue. The terminal excretion half-life of radioactivity in adipose was estimated to be approximately 60 days. Liver:adipose concentration ratios declined with time. Thus, the overall disposition of TBDD appears similar to that observed for the chlorinated analogue, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The dose-dependent tissue disposition and excretion kinetics of these compounds suggest important considerations for extrapolations from high to low doses.

Keywords: *Pharmacokinetics, *Toxicology, Feces, Tissue distribution, Adipose tissue, Liver, Skin(Anatomy), Dose-response relationships, Body weight, Rats, Weight gain, Muscles, Blood, Bile, Reprints, *Tetrabromodibenzodioxins.

PB91-211474/REB PC **A03**/MF **A01**
Symposium Overview: Symposium on Application of Pharmacokinetics in Developmental Toxicity Risk Assessments. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
R. J. Kavlock, D. R. Mattison, H. Nau, J. F. Young, and J. L. Gabrielsson. c1991, 22p EPA/600/J-91/124
Pub. in Fundamental and Applied Toxicology, v16 n2 p213-232 Feb 91. Presented at the Annual Meeting of the Society of Toxicity (SOT) (29th), Miami, FL. Prepared in cooperation with Arkansas Univ. at Little Rock, Freie Univ. Berlin (Germany, F.R.), Uppsala Univ. (Sweden), and Society of Toxicology, Bethesda, MD.

A symposium entitled 'Application of Pharmacokinetics in Developmental Toxicity Risk Assessments' was held at the 29th Annual Meeting of the Society of Toxicology (SOT) in Miami Beach, Florida. It was sponsored by the Reproductive and Developmental Specialty Section of SOT to address the current state of knowledge relating to the use of physiological and metabolic information in reducing the uncertainties inherent in the presently practiced procedures for extrapolating animal toxicology data to the human situation. The goal of the symposium is to communicate where one is in the process of moving pharmacokinetic data from a research mode to an application mode. The first speaker discussed physiological adaptations required for successful pregnancy and how these might impact on the manifestation of developmental toxicity across species. The use of pharmacokinetics for the interpretation of teratogenicity studies in regard to interspecies extrapolation and structure-activity relationships, and how the information might be used to

modify testing protocols to more accurately reflect human exposure patterns was also discussed, as well as the use of multiple correlation procedures to determine which pharmacokinetic parameters are most appropriate as integrated internal dose estimates for quantitative dose-response modelling. Next discussed was rodent whole embryo culture, and how it presents advantages and disadvantages for assessment of pharmacokinetic factors in teratogenesis. Finally, the concept of physiologically based pharmacokinetic modelling and how it can be applied to extrapolate data between species was introduced.

Keywords: *Meetings, *Pharmacokinetics, *Toxicology, *Teratogens, *Risk assessment, Digestive system, Structure-activity relationships, Species specificity, Reproduction(Biology), Fetus, Maternal-fetal exchange, Respiratory system, In vivo analysis, In vitro analysis, Phenols, Pregnancy, Cardiovascular system, Kidney, Reprints.

PB91-211482/REB PC **A02/MF A01**
Quantitative Methods for Cross-Species Mapping (CSM). Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
V. A. Benignus, W. K. Boyes, H. K. Hudnell, C. M. Frey, and D. J. Svendsgaard. c1991, 9p EPA/600/J-91/125
Pub. in Neuroscience and Biobehavioral Reviews, v15 n2 p165-171 1991. Prepared in cooperation with North Carolina Univ. at Chapel Hill.

Cross species extrapolation will be defined as prediction from one species to another without empirical verification. Cross species mapping (CSM) is the same except empirical verification is performed. CSM may be viewed as validation of methods for extrapolation. The paper offers a quantitative method for constructing CSM equations which is useful in evaluation of the CSM and as an aid in the design of new experiments in CSM and extrapolation. The method requires fitting mathematical models for the physiological or behavioral phenomena to be mapped across species. A CSM equation can then be derived from the models in each species and approximate confidence limits may be obtained for predictions from the equation. The method is useful even when the models in the two species differ in form, implying differences in physiology or behavioral principles between species. The method proposed has a number of remaining uncertainties and possible problems.

Keywords: *Species specificity, *Mathematical models, Animals, Humans, Risk assessment, Reprints, *Cross-species mapping.

PB91-211490/REB PC **A03/MF A01**
Health Effects Research Lab., Research Triangle Park, NC.
Insect Virus: Assays for Viral Replication and Persistence in Mammalian Cells. Journal article.
Northrop Services, Inc., Research Triangle Park, NC.
P. C. Hartig, M. C. Cardon, and C. Y. Kawanishi. c1991, 12p EPA/600/J-91/126
Contract EPA-68-02-4450
Pub. in Jnl. of Virological Methods, v31 n2-3 p335-344 Feb 91. See also PB90-146093. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

Viral pesticidal agents must be evaluated for potential health hazards prior to utilization. Assessment of the likelihood of replication in humans has included in vitro exposure of human cells to the potential pesticidal agent. Previous in vitro evaluation strategies have lacked positive controls. Thus, negative results, interpreted as no effect of the virus on human cells, could reflect basic deficiencies in the testing protocols. A study designed a testing scheme for viral pesticides and used it to test the nuclear polyhedrosis virus of Autographa californica. Tests were aimed at evaluating potential replication or gene expression in primate cells. Parallel tests were run utilizing identical protocols with primate viruses known to produce the biological effect being evaluated. Thus protocols described were tested with positive viral controls. (Copyright (c) 1991 Elsevier Science Publishers B.V.)

Keywords: *Insects, *Viruses, *Biological pest control, Virus replication, Viral gene expression regulation, Baculoviruses, Humans, Plasmids, Viral antigens, Nucleic acids, Polyacrylamide gel electrophoresis, Southern blotting, Deoxyribonucleic acids, Reprints.

PB91-211508/REB PC **A03/MF A01**
Norwich Eaton Pharmaceuticals, Inc., Norwich, NY.
Long-Term Behavioral and Neurochemical Effects of Intradentate Administration of Colchicine in Rats. Journal article.
National Inst. of Environmental Health Sciences, Research Triangle Park, NC. Lab. of Molecular and Integrative Neuroscience.
P. Tandon, S. Barone, E. G. Drust, and H. A. Tilson. c1991, 14p EPA/600/J-91/127
Pub. in NeuroToxicology, v12 n1 p67-78 1991. Prepared in cooperation with East Carolina Univ. School of Medicine, Greenville, NC. Sponsored by Norwich Eaton Pharmaceuticals, Inc., Norwich, NY., and Health Effects Research Lab., Research Triangle Park, NC.

Previous work has shown that the intradentate administration of colchicine produces time-dependent behavioral and neurochemical changes. Deficits in learning and memory and alterations in the signal transduction process for the cholinergic muscarinic receptor have been observed up to 12 weeks after colchicine treatment. To study the long-term effects of colchicine administration on cognitive function and the cholinergic system, 6 month-old male, Fischer-344 rats were injected with 2.5 microgram of colchicine bilaterally in the dorsal and ventral hippocampus. Twelve months later the animals were tested for the acquisition of a spatial reference memory task in the Morris water maze for 8 days, with 4 trials of 60 seconds each day. At the completion of the behavioral testing, one half of the rats were used for histochemical studies. A significant deficit in acquisition in the water maze was observed in animals 1 year after colchicine administration. Neurochemical studies showed an increase in carbachol-induced PI metabolism in the rat hippocampus 1 year post-lesion with colchicine.

Keywords: *Behavior, *Toxicology, *Colchicine, Neuroregulators, Hippocampus, Phosphoinositides, Spatial behavior, Immunohistochemistry, Acetylcholinesterase, Choline acetyltransferase, Reprints.

PB91-211516/REB PC **A03/MF A01**
Evaluating Capacities of GAC Preloaded with Natural Water (Paper No. 25489). Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
T. F. Speth. c1991, 16p EPA/600/J-91/128
Pub. in Jnl. of Environmental Engineering, v117 n1 p66-79 Jan/Feb 91. See also PB91-162800.

Adsorption studies were conducted to determine how preloading a natural groundwater onto granular activated carbon affects the adsorption of cis-1,2-dichloroethene in small-scale and pilot-scale columns. Capacities were determined from batch-isotherm tests, microcolumns, and pilot columns, which were preloaded for various lengths of time. Breakthrough profiles from short-bed adsorbers and pilot columns provided information regarding the kinetics of adsorption. Some of the results are: adsorption capacity and kinetic rate decreased with increasing time of preloading, the preloaded microcolumns showed capacity reductions similar to that of the preloaded pilot columns, and preloaded column capacities were represented well by preloaded isotherms. The reduction in pilot-column capacity due to preloading for cis-1,2-dichloroethene was shown to be partially off-set by using columns in series where the columns were only added when needed to contain the mass-transfer zone. For cis-1,2-dichloroethene, the increased run time due to adding columns may not be worthwhile in field applications. However, for stronger adsorbing compounds, or columns which are preloaded before the contaminant of interest arrives, a significant improvement in carbon performance may result.

Keywords: *Activated carbon treatment, *Water treatment, *Water pollution control, Adsorption, Capacity, Isotherms, Kinetics, Dichloroethylenes, Technology assessment, Ground water, Reprints, *Granular activated carbon.

PB91-211524/REB PC **A01/MF A01**
Removing Inorganics: Common Methods Have Limits. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
T. J. Sorg. cJun 91, 5p EPA/600/J-91/129
Pub. in Water Technology, v19 n6 p57-60 Jun 91.

When EPA sets a regulation (a maximum contaminant level) for a contaminant, it must also specify the 'best available technology' (BAT) that can be used to remove the contaminant. Because the regulations apply to community water systems, the technologies selected are ones that are commonly used to treat community size water systems. Thus, EPA R and D program has focused its efforts on evaluating primarily community applied technologies such as conventional coagulation-filtration, lime softening, ion exchange, adsorption, and membrane process. When BAT is identified for a specific contaminant, frequently the BAT will be listed with its limitations because the process is often not effective under all water quality conditions. The same limitations would also apply to POU/POE treatment. The paper discusses EPA's regulations on inorganic contaminants, the best available technologies cited by EPA, and the limitations of the processes. Using arsenic as an example, the impact of the contaminant chemistry and water quality on removals is presented.

Keywords: *Pollution regulations, *Water pollution abatement, *Potable water, *Inorganic compounds, *Water treatment, Best technology, US EPA, Performance standards, Standards compliance, Water quality, Water softening, Membranes, Adsorption, Ion exchanging, Research and development, Water pollution control, Arsenic, Distribution systems, Coagulation, Filtration, Reprints, Community relations, Point of use treatment, Point of entry treatment.

PB91-211813/REB PC **A06/MF A01**
RCRA Implementation Plan, FY 1992. Directive (Final).
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
S. Jones. May 91, 102p EPA/530/SW-91/023, OSWER DIRECTIVE-9420.00-07
See also PB91-211839.

The directive discusses the RCRA Implementation Plan (RIP). RIP provides an overview of the main objectives of the national RCRA solid and hazardous waste management program, identifies priority activities that will be tracked in the Strategic Targeted Activities for Results (STARS) and addresses resource allocations for the upcoming Fiscal Year.

Keywords: *Waste management, *Superfund, *Hazardous materials, Operations, Environment management, Ranking, Guidelines, State implementation plans, Law enforcement, Industrial wastes, Municipal wastes, Pollution regulations, Environmental policy, *Office of Solid Waste and Emergency Response, *RCRA implementation plans, Resource Conservation and Recovery Act, Strategic Targeted Activities for Results System.

PB91-211821/REB PC **A04/MF A01**
National Survey of Hazardous Waste Generators and Treatment, Storage, Disposal, and Recycling Facilities in 1986. Hazardous Waste Management in RCRA TSDR Units.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
J. Fogarty. Jul 91, 69p EPA/530/SW-91/060
See also PB86-197837.

The report presents the initial findings of 2 extensive national surveys conducted by mail over a 3-year period to obtain detailed information concerning hazardous waste generation and management practices occurring in calendar year 1986. The 2 surveys (Generator Survey) and (TSDR Survey) focused on hazardous waste handlers regulated under Subtitle C of RCRA.

Keywords: *Hazardous materials, *Waste management, *Pollution control, Environmental surveys, Questionnaires, Waste treatment, Waste storage, Waste disposal, Waste recycling, Permits, Information transfer, Hazardous materials transportation, Toxicity, Pollution abatement, Surface impoundments, Pollution regulations, Data processing, Operators, Industrial wastes, Land disposal, Resource Conservation and Recovery Act.

PB91-211839/REB PC **A07/MF A01**
RCRA Implementation Plan, FY 1991.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
1991, 146p EPA/530/SW-91/042

See also PB91-211813 and report for 1990, PB91-156695.

The annual operating guidance outlines EPA's programs for FY 1991. It provides an overview of the main objectives for the national program and for initiatives to prevent pollution, improve management, strengthen enforcement, foster greater public involvement, and bolster science. For EPA and State program managers in the field, it suggests priorities and activities that will be tracked by the Strategic Targeted Activities for Results System (STARS, formerly SPMS). The guidance is an important quarterly indicator of EPA's progress. It helps the Agency measure its accomplishments, as well as uncover and address problems requiring greater attention.

Keywords: *State implementation plans, *Waste management, *Environmental policy, Waste disposal, Natural resources management, US EPA, Pollution abatement, Law enforcement, Guidelines, Superfund, Pollution regulations, Hazardous materials, Environment management, Operations, Emergency plans, Storage tanks, Underground storage, Chemical spills, *Resource Conservation and Recovery Act, *Strategic Targeted Activities for Results System, *RCRA implementation plans, SPMS targets, Community relations, Cleanup operations, National Priorities List.

PB91-211847/REB PC **A04**/MF **A01**
Proceedings of U.S./FRG Workshop on Photochemical Ozone Problem and Its Control (2nd). Held in Chapel Hill, North Carolina on June 5-8, 1990. Symposium paper.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
K. Becker, M. Gery, R. Derwent, A. Ebel, and H. Jeffries. Jul 91, 69p EPA/600/9-91/020
See also PB89-233514. Prepared in cooperation with Umweltbundesamt, Berlin (Germany, F.R.).

The Second US-FRG Workshop on the Photochemical Ozone Problem and Its Control was held in Chapel Hill, NC, USA, on June 5-8, 1990. Its scope was expanded, relative to the First Workshop, to include subjects of interest to the Commission of European Communities and to the United Kingdom Department of the Environment. Specific topics included policy developments in the US and Europe, atmospheric chemistry of organic pollutants, the relationships of ozone to its precursors and models of such relationships, the EMEP photochemical ozone model and on-going research programs in Europe and the US. The Workshop Steering Committee offered recommendations for a third workshop in 1992 in Europe, for specific workshop topics, for joint US-Europe studies, and for cooperative training programs.

Keywords: *Ozone, *Air pollution, *Meetings, *Photochemical reactions, *Air pollution abatement, Hydrocarbons, Atmospheric chemistry, Nitrogen oxides, Peroxyacetyl nitrate, United States, Hydrogen peroxide, Federal Republic of Germany, Europe, Air pollution monitoring, Emission factors, Troposphere, Mathematical models, Volatile organic compounds.

PB91-211854/REB PC **A03**/MF **A01**
Army Medical Research and Development Command, Fort Detrick, MD.
Inhalation Toxicology of Red and Violet Mixtures. Chamber Concentration and Particle Size Distribution Report.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
M. A. Higuchi, and D. W. Davies. Jul 91, 39p EPA/600/1-91/003
See also AD-A211 666. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC. Sponsored by Army Medical Research and Development Command, Fort Detrick, MD.

An inhalation exposure facility was developed at the U.S. EPA, RTP, NC to conduct inhalation exposures of rodents and guinea pigs to dye mixtures used by the U.S. Army in the manufacture of smoke munitions. Initially, an evaluation of the prototype chamber aerosol homogeneity was conducted to determine the uniformity and reproducibility of the concentration and particle size of dye aerosol throughout the breathing zone of the test animals (Davies, et al.). The three dyes, DR11, SR1, and DB3, were chemically analyzed for purity and optically examined for size and shape. All pure dyes appeared to be stable at room temperature except DB3, which decomposes if not stored at 4 C. The particle size ranges varied for each pure dye and structures were either amorphous (azo dye) or crystalline (anthraquinone dyes). The bulk red and violet dye mixtures were analyzed for composition. The chemical analysis of the relative composition of each dye mixture, collected by cascade impactor sampling, revealed fractionation of the mixtures into component dyes.

Keywords: *Air pollution effects(Animals), *Indoor air pollutants, *Dyes, *Mixtures, *Smoke munitions, *Toxicology, *Red(Color), Rodents, Chemical analysis, Particle size, Graphs(Charts), Tables(Data), *Violet(Color).

PB91-211862/REB PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Nitrogen Oxide Control for Stationary Combustion Sources.
JACA Corp., Fort Washington, PA.
T. Beggs. Jul 86, 58p EPA/625/5-86/020
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

Nitrogen dioxide is a criteria pollutant under the Clean Air Act and emissions of nitrogen oxides must be controlled to achieve attainment with the ambient standards. The handbook presents an overview of technologies that may be applicable to control the four major stationary sources of NOx. A basic overview, including costs, of control technology available between 1981 and 1984 is presented for facility operators/owners, regulatory staff, vendors, and others who need to be familiar with ways to reduce NOx emissions. Options available in the mid-1980's are assessed along with results that may be expected from the given technology.

Keywords: *Nitrogen dioxide, *Nitrogen oxides, *Air pollution control equipment, *Stationary sources, *Combustion, *Boilers, Technology assessment, Cost analysis, Reviews, *Gas turbines, Control alternatives.

PB91-211870/REB PC **A03**/MF **A01**
Pesticide Fact Sheet No. 223: Dithiopyr.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
18 Jun 91, 12p EPA/540/FS-91/137

The document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on dithiopyr, a herbicide. A Fact Sheet is issued after one of the following actions has occurred. (1) Issuance or reissuance of a registration standard, (2) Issuance of each special review document, (3) Registration of a significantly changed use pattern, (4) Registration of a new chemical, or (5) An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

Keywords: *Herbicides, *Toxic substances, *Regulations, Standards, Hazardous materials, Chemical properties, Toxicology, Ecology, Agricultural products, Utilization, *Dithiopyr, Path of pollutants, Chemical information fact sheet, CAS 97886-45-8.

PB91-211888/REB PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Air/Superfund National Technical Guidance Study Series: Estimation of Air Impacts for Air Stripping of Contaminated Water.
Radian Corp., Austin, TX.
B. Eklund, S. Smith, and M. Hunt. May 91, 36p EPA/450/1-91/002
Contract EPA-68-02-4464
See also PB91-190975. Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

Analysis of the air impacts associated with the alternatives to cleaning up Superfund sites is frequently required for planning purposes prior to actual cleanup. Such analyses depend on estimates rather than on field measurements. The report provides procedures for estimating the emissions and ambient air concentrations associated with air stripping - a widely used technique for removing volatile organic compounds (VOC) from contaminated water. Procedures are given to evaluate the effect of the concentration of contaminants in water, the stripping efficiency and the stripping rate on the emission rates and on the ambient air concentrations at selected distances from the air stripper. Henry's Law constants are provided for over 130 compounds to assist in determining stripping efficiencies. Health-based action levels are also provided for the 130 compounds for comparison to the estimated ambient air concentrations. Action levels are also expressed in terms of water concentrations using conservative estimates of emissions and dispersion.

Keywords: *Superfund, *Remedial action, *Water pollution control, *Air pollution effects(Humans), *Toxic substances, *Public health, Stripping, Volatile organic compounds, Concentration(Composition), Study estimates, Biological effects, Physical properties, Chemical properties, Henry's law, Substitutes, Cleanup operations.

PB91-211896/REB PC **A12**/MF **A02**
Evaluation and Effective Risk Communications Workshop Proceedings. Held in Washington, DC. in June 1988. Final rept.
Interagency Task Force on Environmental Cancer and Heart and Lung Disease, Washington, DC.
A. Fisher, M. Pavlova, and V. Covello. Jan 91, 273p EPA/600/9-90/054

To explore a number of questions in the area of risk communications, the Interagency Task Force on Environmental Cancer and Heart and Lung Disease, held a Workshop on Evaluation and Effective Risk Communication which brought together experts from academia, government agencies, and the private sector. The workshop's objectives were to: (1) Improve understanding of evaluation problems and tasks; (2) Survey principles and methods of evaluation relevant to risk communication; (3) Illustrate the practice of evaluation through examples; (4) Provide guidance for organizations engaged in planning and coordinating the evaluation of risk communication; (5) Derive recommendations for improving risk communication; and to (6) Identify future needs. The workshop proceedings provide an overview of the principles and methods of evaluation and of their application to risk communication programs. The volume includes four papers, five presentations on how to implement evaluation of risk communication, 14 discussions of various practical aspects of such evaluations, and summaries of 16 case study evaluation.

Keywords: *Meetings, *Public health education, *Risk assessment, *Evaluation, Neoplasms, Heart diseases, Lung diseases, Environmental pollutants, Program evaluation, Case studies, Information dissemination, Communication, *Risk communications.

PB91-211904/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Correlation of Florida Soil-Gas Permeabilities with Grain Size, Moisture, and Porosity. Final rept. Oct 89-Apr 90.
Rogers and Associates Engineering Corp., Salt Lake City, UT.
V. C. Rogers, and K. K. Nielson. Jun 91, 44p EPA/600/8-91/039
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab., and Florida Dept. of Community Affairs, Tallahassee.

The report describes a new correlation for predicting gas permeabilities of undisturbed or recompacted soils from their average grain diameter (d), moisture saturation factor (m), and porosity (p). The correlation exhibits a geometric standard deviation (GSD) of only 1.27 between measured and predicted permeabilities for the Florida soils, with no residual bias, and a GSD of 1.44 for the combined Florida and previously obtained Utah data sets with a 3% negative bias. Results of a literature review of previous relations between soil properties and gas or water permeabilities show that previous exponents for particle size dependence have ranged from 1.11 to 2.05, consistent with the present value of 1.33. The work was performed in connection with the broader Florida Department of Community Affairs (DCA) effort to define radon-protective standards for sub-slab fill materials. It also has applications in EPA and other agency efforts to assess radon potentials of soils and correlate indoor radon concentrations with source strengths.

Keywords: *Soils, *Permeability, *Gases, *Porosity, *Florida, Soil water, Pollution control, Radon 222, Utah, Soil properties, Statistical analysis, Pollution, Reviews, Grain size, Predicting.

PB91-211912/REB PC **A06**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Health Research.
Role of Health Research in Support of EPA's Regulatory Programs. Final rept.
Eastern Research Group, Inc., Arlington, MA.
L. Beyer. Jun 90, 104p EPA/600/9-90/034
Contract EPA-68D90133
Sponsored by Environmental Protection Agency, Washington, DC. Office of Health Research.

The document highlights the ongoing role of environmental health research in support of the Environmental Protection Agency's regulatory programs. It summarizes the key legislation, emphasizing the uses of health research, and identifies the most important research needs for each program office. The document shows the key role played by environmental health research in EPA's regulatory activities and points out that certain research needs are common across all the programs.

Keywords: *Health risk, *Environmental research, *Pollution regulations, *Public health, Legislation, US EPA, Pollution sources, Exposure, Decision making, Superfund, Waste management, Air quality, Potable water, Water quality, Pesticides, Toxic substances, Hazardous materials.

PB91-211920/REB PC **A04**/MF **A01**
Preparation Aids for the Development of Category 2 Quality Assurance Project Plans.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
G. F. Simes. Feb 91, 72p EPA/600/8-91/004
See also PB91-148312.

Data collection activities performed for the Risk Reduction Engineering Laboratory (RREL) of the U.S. Environmental Protection Agency are divided into four categories, depending on the intended use of the data. Quality Assurance (QA) Project Plans are written to ensure that project needs will be met and that quality control procedures are sufficient for obtaining data of known quality. Projects that are of sufficient scope and substance that their results could be combined with the results of other projects of similar scope to produce narratives that would be used for rule-making, regulation making, or policy making are identified as Category II projects. The Category II manual contains detailed descriptions of each of the 12 required elements of a Category II QA Project Plan. Also included are definitions and explanations of frequently used terms, examples of QA forms and charts, sample equations and numerous types of tables suggested for summarizing information.

Keywords: *Environmental surveys, *Project planning, *Environmental protection, Management planning, Pollution regulations, Law enforcement, Risk assessment, Data acquisition, Data processing, Standards, Sampling, Quality control, Performance evaluation, Records management, *Quality Assurance Project Plans.

PB91-211938/REB PC **A04**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Measurement of Hydraulic Conductivity Distributions: A Manual of Practice.
Auburn Univ., AL. Dept. of Civil Engineering.
F. J. Molz, O. Gueven, and J. G. Melville. Mar 90, 73p EPA/600/8-90/046
Grant EPA-R-813647
Prepared in cooperation with Geological Survey, Denver, CO. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

The ability of hydrologists to perform field measurements of aquifer hydraulic properties must be enhanced in order to significantly improve the capacity to solve ground water contamination problems at Superfund and other sites. The primary purpose of the manual is to provide new methodologies for measuring K(z), the distribution of horizontal hydraulic conductivity in the vertical direction in the vicinity of a test well. Measurements in nearby wells can then be used to estimate three-dimensional distributions. As dispersion-dominated models (particularly two-dimensional, vertically-averaged models) approach their limitations, it is becoming increasingly important to develop two-dimensional vertical profile or fully three-dimensional advection-dominated transport models in order to significantly increase the ability to understand and predict contaminant transport, reaction, and degradation in the field. Such models require the measurement of hydraulic conductivity distributions, K(z), rather than vertically averaged values in the form of transmissivities. Three devices for measuring K(z) distributions (the impeller flowmeter, the heat-pulse flowmeter, and a multi-level slug test apparatus) are described in detail, along with application and data reduction procedures. Results of the various methods are compared with each other and with the results of tracer studies. The flowmeter approach emerged as the best candidate for routine K(z) measurements. Impeller meters are now available commercially, and the more sensitive flowmeters (heat pulse and electromagnetic) are expected to be available in the near future.

Keywords: *Water pollution, *Hydraulic conductivity, *Aquifers, Water flow, Hydrology, Vertical migration, Groundwater movement, Base flow, Fracture permeability, Flowmeters, Case studies, Waste disposal, Rock properties, Measuring instruments, Design criteria, Performance evaluation, Three-dimensional calculations, Environmental transport, Impeller meters.

PB91-211946/REB PC **A07**/MF **A02**
Environmental Protection Agency, Seattle, WA. Region X.
Reconnaissance Survey of Chemical Contamination and Biological Effects in Southern Puget Sound.
PTI Environmental Services, Bellevue, WA.
Apr 91, 134p EPA/910/9-90/025
Contract EPA-68-D8-0085
Sponsored by Environmental Protection Agency, Seattle, WA. Region X.

The report describes the results of a field survey south of the Tacoma Narrows bridge in southern Puget Sound. Environmental conditions were evaluated in two urban embayments, eight nonurban embayments and three areas of the main channel in the southern Sound. Stations were located in depositional areas where chemical contaminants would be expected to accumulate in the sediments. All stations were located away from known contaminant sources in order to provide integrative assessments of contamination over relatively large areas. Chemical contamination of the south Sound was evaluated by measuring chemical concentrations in subtidal bottom sediments. Bioaccumulation of chemical contaminants was evaluated by measuring chemical concentrations in flatfish muscle tissues and littleneck clam meats. Chemical-related biological effects were evaluated by conducting amphipod sediment bioassays and histopathological analyses on livers of English sole.

Keywords: *Puget Sound, *Water pollution effects, *Marine biology, *Chemical compounds, *Water pollution sampling, Reconnaissance, Sediments, Embankments, Pollution sources, Animal pathology, Bioaccumulation, Bioassay, Biological effects, Fishes, Toxicity.

PB91-211953/REB PC **A07**/MF **A01**
Environmental Protection Agency, Seattle, WA. Region X.
Pollutants of Concern in Puget Sound.
PTI Environmental Services, Bellevue, WA.
Apr 91, 127p EPA/910/9-91/003
Contract EPA-68-D8-0085
Sponsored by Environmental Protection Agency, Seattle, WA. Region X.

The report replaces and updates information originally compiled for the 1986 User's Manual for the Pollutant of Concern Matrix. The information in the report is available only in hard copy, not in a spreadsheet format as in 1986. The report contains the following information on tables, for 64 pollutants: Regulatory status and analytical considerations; Criteria, guidelines and regulatory action levels; Sources of pollutants; and Concentrations of pollutants in Puget Sound. The report also contains a narrative section on each pollutant, describing exposure routes and risks, sources and fate in the environment, and other information. The information contained in the report is useful to permit writers and reviewers, resource managers, writers and reviewers of environmental impact statements and others.

Keywords: *Water pollution, *Pollutant identification, *Puget Sound, *Environmental surveys, Pollution regulations, Water pollution detection, Guidelines, Water pollution sources, Water pollution sampling, Tables(Data), Exposure, Risk assessment, Environmental transport, Information transfer, Sediments, Biological effects, Ecosystems.

PB91-212324/REB PC **A04**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Microbial Degradation of Alkylbenzenes under Sulfate-Reducing and Methanogenic Conditions. Final rept. May 89-Apr 91.
Stanford Univ., CA. Dept. of Civil Engineering.
H. R. Beller, E. A. Edwards, D. Grbic-Galic, and M. Reinhard. Jul 91, 74p EPA/600/2-91/027
Grant EPA-R-815721
Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Aquifer solids and soils obtained from various hydrocarbon-contaminated sites were used to investigate the ability of indigenous microorganisms to degrade monoaromatic hydrocarbons under strictly anaerobic conditions. In anaerobic microcosms inoculated with fuel-contaminated soil from the Patuxent River site, toluene degradation occurred concomitantly with sulfate reduction and ferric iron reduction. Similar results were obtained with suspended enrichments derived from the microcosms. Stoichiometric data and other observations suggested that sulfate reduction was closely linked to toluene degradation, whereas iron reduction was a secondary, potentially abiotic, reaction between ferric iron and biogenic hydrogen sulfide. The presence of millimolar concentrations of amorphous Fe(OH)3 in Patuxent River microcosms and enrichments either greatly facilitated the onset of toluene degradation or accelerated the rate once degradation had begun. Fermentative/methanogenic microcosms and enrichments that degraded toluene and o-xylene without added exogenous electron acceptors (except CO2) were developed from creosote-contaminated Pensacola samples. The microcosms initially underwent an acclimation lag of several months; however, once the degradation of aromatic hydrocarbons was initiated, it proceeded at a relatively rapid rate, and it was complete (resulting in mineralization to CO2 and CH4). Benzene, ethylbenzene, and p-xylene were not degraded.

Keywords: *Microbial degradation, *Aromatic hydrocarbons, *Water pollution control, *Land pollution control, *Sulfate reducing bacteria, *Methanogenic bacteria, Biocontrol, Soil contamination, Storage tanks, Underground storage, Anaerobic processes, Fermentation, Aquifers, Environmental transport, Biodeterioration, Iron, Toluene, Benzenes, Fuel storage.

PB91-213488/REB PC **A02**/MF **A01**
Memorandum of Understanding between DOD and EPA for the Implementation of P.L. 96-510 (CERCLA). Directive (Final).
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
12 Aug 83, 9p OSWER DIRECTIVE/9295.3-01

The directive clarifies both DOD and EPA's responsibilities and commitments for conducting and financing response actions authorized by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and specifically delegated by Executive Order 12316.

Keywords: *Superfund, *Waste management, *Hazardous materials, Remedial action, Pollution regulations, US DOD, US EPA, Interagency cooperation, Implementation, Decisions and orders, Financing, Administrative procedures, Authority, *Office of Solid Waste and Emergency Response, Cooperative agreements, Comprehensive Environmental Response Compensation and Liability Act.

PB91-213496/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.

Regulation of Postnatal beta-Adrenergic Receptor/Adenylate Cyclase Development by Prenatal Agonist Stimulation and Steroids: Alterations in Rat Kidney and Lung after Exposure to Terbutaline or Dexamethasone. Journal article.
Duke Univ. Medical Center, Durham, NC. Dept. of Pharmacology.
E. M. Kudlacz, H. A. Navarro, R. J. Kavlock, and T. A. Slotkin. c1990, 11p EPA/600/J-90/526
Grants EPA-R-813769, PHS-HD-09713
Pub. in Jnl. of Developmental Physiology 14, p273-281 1990. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div., and Public Health Service, Rockville, MD.

Glucocorticoids and adrenergic stimulation are both thought to control the development of beta-adrenergic receptors/responses. In the current study, rats were exposed to dexamethasone or terbutaline during late gestation and the development of beta-binding capabilities and adenylate cyclase activity evaluated in membrane preparations from kidney and lung. Prenatal dexamethasone exposure produced postnatal adrenergic hyperreactivity of kidney adenylate cyclase; the effect resulted from increases in the enzyme itself, as both basal adenylate cyclase and forskolin-stimulation of the enzyme were also increased by dexamethasone. Similarly, prenatal terbutaline exposure evoked increases in basal, isoproterenol-stimulated and forskolin-stimulated adenylate cyclase in the kidney. In the lung, dexamethasone produced an initial postnatal deficit in basal asenylate cyclase and deficient responsiveness to isoproterenol, but the deficit resolved shortly after birth. Terbutaline selectively promoted the ability of isoproterenol to stimulate lung adenylate cyclase in the first few days after birth, without alterations in basal adenylate cyclase; this was followed by a period of prolonged subsensitivity of both basal and isoproterenol-stimulated activity.

Keywords: *Beta adrenergic receptors, *Adenylate cyclase, *Kidney, *Lung, *Dexamethasone, Rats, Prenatal exposure delayed effects, Forskolin, Body weight, Binding sites, *Terbutaline, Reprints.

PB91-213504/REB PC **A03**/MF **A01**
Characterization of Normal Human Lung Lymphocytes and Interleukin-2-Induced Lung T Cell Lines. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
S. Becker, D. T. Harris, and H. S. Koren. c1990, 12p EPA/600/J-90/527
Pub. in American Jnl. of Respiratory Cell and Molecular Biology, v3 n5 p441-448 Nov 90. Prepared in cooperation with ABB Environmental Services, Inc., Chapel Hill, NC.

Lymphocytes from the lower respiratory tract were obtained by bronchoalveolar lavage of healthy, nonsmoking individuals. Various monoclonal antibodies characterizing activated T cells, helper-inducer and suppressor-inducer T cell subsets, and naive versus memory cells were used to define the phenotype of these lymphocytes. The highly variable CD4/CD8 ratio (0.3 to 6.6; mean=2.1) and the large proportion of the T cells expressing HLA-DR (9 to 38%; mean=21%) sugested that the T cells were recently activated by antigens selectively stimulating either helper or cytotoxic/suppressor T cell function. The majority (>70%) of the CD4+ helper T cells was CD45RO+ CD45RA-, a phenotype found on T cells that provide help for B cell immunoglobulin synthesis. Lung T cells proliferated poorly in response to phytohemagglutinin and concanavalin A but did respond to activation with low concentrations of anti-CD3 mAB (2 to 25 ng/ml) and to interleukin-2 (IL-2) alone to similar extent as did autologous peripheral blood lymphocytes.

Keywords: Lung, *T lymphocytes, *Cell line, *Interleukin-2, Humans, Bronchoalveolar lavage fluid, Monoclonal antibodies, Phenotype, HLA-DR antigens, Cytotoxic T lymphocytes, CD antigens, Immunoglobulins, Mitogens, Flow cytometry, Fluorescent antibody techniques, Fluorescence, Reprints.

PB91-213512/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
Approximation of Surfaces in Quantitative 3-D Reconstructions. Journal article.
Duke Univ. Medical Center, Durham, NC.
R. R. Mercer, G. M. McCauley, and S. Anjilvel. c1990, 14p EPA/600/J-90/528
Grant EPA-R-813113
Pub. in IEEE Transactions on Biomedical Engineering, v37 n12 p1136-1146 Dec 90. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.

In serial section reconstructions a series of planar profiles are taken representing curves on the surface of the structure to be reconstructed. For a number of quantitative serial section methods, approximation of a surface is done by the formation of tiles between points of adjanent profiles. As generally proposed, finding this approximation has been difficult due to the inordinately large number of possible solutions resulting from different combinations of tiles between points. Current algorithms have either applied heuristic criteria to force the formation of only one solution or have searched all acceptable combinations for one that minimizes some cost function. The algorithm presented has been developed to choose the tiling which minimizes the estimated error when the tile approximation of the surface is used in subsequent quantitative algorithms such as the calculation of surface area. (Copyright (c) 1990 IEEE.)

Keywords: *Biomedical engineering, *Image reconstruction, *Three dimensional models, Algorithms, Approximation, Computer calculations, Surface geometry, Reprints, Tiling.

PB91-213520/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
Spatial Distribution of Collagen and Elastin Fibers in the Lungs. Journal article.
Duke Univ. Medical Center, Durham, NC.
R. R. Mercer, and J. D. Crapo. c1990, 12p EPA/600/J-90/529
Grant EPA-R-813113
Pub. in Jnl. of Applied Physiology, v69 n2 p756-76% Sep 90. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.

Surface tension forces acting on the thin-walled alveolar septa and the collagen-elastin fiber network are major factors in lung parenchymal micro-mechanics. Quantitative serial section analysis and morphometric evaluations of planar sections were used to determine the spatial location of collagen and elastin fibers in Sprague Dawley rat and normal human lung samples. A large concentration of connective tissue fibers was located in the alveolar duct wall in both species. For rats, the tissue density of collagen and elastin fibers located within 10 micrometers of an alveolar duct were 13 and 9% respectively. In human lung samples, the tissue density of collagen and elastin fibers withon 20 micrometers of an alveolar duct were 18 and 16% respectively. In both species, bands of elastin fibers formed a continuous ring around each alveolar mouth. In human lungs elastin fibers were found to penetrate significantly deeper into alveolar septal walls than they did in rat lungs. The concentration of connective tissue elements in the alveolar duct walls of both species is consistent with their proposed roles as the principal load bearing elements of the lung parenchyma. (Copyright (c) 1990 the American Physiological Society.)

Keywords: *Collagen, *Elastin, *Morphology, *Lung, *Connective tissue, Spatial distribution, Humans, Rats, Pulmonary alveoli, Reprints.

PB91-213538/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
Measurement of Boundaries Using a Digitizer Tablet. Journal article.
Duke Univ. Medical Center, Durham, NC.
R. R. Mercer, S. H. Randell, and S. L. Young. Oct 90, 11p EPA/600/J-90/530
Grant EPA-R-813113
Pub. in Jnl. of Microscopy, v160 pt1 p97-105 Oct 90. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.

The perimeter is the most error prone of the primary measurements (length, perimeter and area) made when using a device such as a digitizer tablet to trace profiles on micrographs. To allow for minimization of the error an expression is developed relating the error in the perimeter to the digitizer resolution plus other errors in the entry process. The predictions of the expression are shown to be in good agreement with the results of computer simulation of the tracing process, as well as results from manual tracing using a digitizer tablet. The analysis of the digitizer entry process also provides a method by which an optimal choice of the sample spacing between digitizer coordinates can be made. (Copyright (c) 1990 The Royal Microscopical Society.)

Keywords: *Computer graphics, *Analog to digital converters, Microscopy, Error analysis, Boundaries, Measurement, Mathematical models, Reprints, Morphometry.

PB91-213546/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Monitoring IACP Samples and Construction of a Centralized Database.
Environmental Health Research and Testing, Inc., Research Triangle Park, NC.
D. B. Walsh, D. B. Ray, and J. Simonson. 1991, 13p EPA/600/D-91/122
Contracts EPA-68-DO-0106, EPA-68-02-4456
Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The Integrated Air Cancer Project (IACP) is a multiyear US EPA research program established to develop and evaluate methods required to identify the principal airborne carcinogens, determine emission sources, and improve the estimate of comparative human cancer risk. The first major field study designed to examine a residential wood combustion airshed was conducted in Boise, Idaho during the 1986-1987 winter heating season. The second major field study conducted in Roanoke, Virgina during the 1988-1989 was to study residential oil heating and wood combustion. Motor vehicle emissions were considered a major combustion product contributor in both airsheds. This paper describes two critical components of the project. The first component is the sample custody and tracking of the samples before analysis. The second component describes the data management of the sample field data (eg. sample site, time, date, flow rate) as well as the analytical data (eg. mutagenicity, particle concentrations) for the environmental samples.

Keywords: *Air pollution effects(Humans), *Public health, *Air pollution sampling, *Information systems, Pollution sources, Concentration(Composition), Exhaust emissions, Carcinogens, Combustion products, Site surveys, Data base management, Risk assessment, Data processing, *Integrated Air Cancer Project, Boise(Idaho), Roanoke(Virginia).

PB91-213553/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Stability of PPB and PPM Organic Cylinder Gases Used for Calibration and Audits.
Research Triangle Inst., Research Triangle Park, NC.
R. K. M. Jayanty, J. R. Albritton, Y. H. Straley, and D. J. von Lehmden. 1991, 17p EPA/600/D-91/123
Contract EPA-68-D-10009
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

During the past few years, the need for accurate and stable standards for determining toxic organics during hazardous waste trial burn tests, compliance source testing, and ambient measurements has become increasingly evident. The scientific and regulatory problems associated with toxic organic pollution cannot be resolved satisfactorily without adequately characterized standards. The USEPA's Atmospheric Research and Exposure Assessment Laboratory has initiated a program to develop stable, accurate organic standards for use in calibration and performance audits. Gaseous organic compounds at parts-per-million (5 to 700 ppm) and parts-per-billion (1 to 10,000 ppb) levels in compressed gas cylinders have been developed. The main objectives of the program are: (1) to provide accurate gas mixtures to assess the relative accuracy of measurement systems during hazardous waste trial burn tests, source compliance testing, and ambient air measurements; (2) to verify the manufacturer's certified analysis of the gas mixtures; and (3) to determine

the stability of the organic in compressed gas cylinders. The paper discussed the logic used in selecting organic compounds to develop the cylinder gas approach, summarizes the standards that are currently available plus standards planned for future study, and describes the procedures used to determine the stability of the gaseous compounds in the compressed gas cylinders. The long-term stability data, including the determination of total measurement uncertainty, are also summarized.

Keywords: *Volatile organic compounds, *Calibration standards, *Stability, Performance tests, Compressed gases, Air pollution, Toxic substances, Waste disposal, Hazardous waste burn tests.

PB91-213561/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Hydrocarbon Continuous Monitoring Systems for Hazardous Waste Incinerator Emissions Measurement.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
L. Cone, T. Logan, and R. Rollins. 1991, 22p EPA/600/D-91/124
Contract EPA-68-02-4442
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The U.S. Environmental Protection Agency has sponsored an extended laboratory and field evaluation of continuous emission monitoring systems available to measure hydrocarbon emissions from hazardous waste incinerators. Performance tests of calibration drift, calibration error, response time, and instrument sensitivity to various hydrocarbons were conducted during the laboratory evaluation and two six-week field tests. Comparisons were also made between hydrocarbon emissions as measured by heated and unheated sample delivery systems. Long-term measurement of hydrocarbon emissions using a heated sampling system and flame ionization detector has been difficult to achieve at hazardous waste incinerators. During this test program, it was demonstrated that it is possible to operate a heated hydrocarbon monitoring system continuously for extended time periods with no system repair or maintenance. A gas sampling system providing simultaneous carbon monoxide and oxygen emissions data was also operated during the field tests.

Keywords: *Air pollution monitoring, *Incineration, *Waste disposal, *Hazardous materials, *Hydrocarbons, Continuous sampling, Performance evaluation, Long term effects, Heating, Flame ionization, Carbon monoxide, Oxygen, Combustion efficiency, Experimental design, Field tests.

PB91-213579/REB PC **A03/MF A01**
EPA's Indoor Air Quality and Work Environment Survey: Relationships of Employees' Self-Reported Health Symptoms with Direct Indoor Air Quality Measurements.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
C. J. Nelson, C. A. Clayton, L. A. Wallace, V. R. Highsmith, and M. Kollander. 7 Jun 91, 39p EPA/600/D-91/125
Presented at IAQ 91, 'Healthy Buildings' held in Washington, DC. on September 4-8, 1991. Prepared in cooperation with Research Triangle Inst., Research Triangle Park, NC., Maryland Univ. at Baltimore, and Yale Univ., New Haven, CT.

In recent years, employees at the three headquarters buildings of the U.S. Environmental Protection Agency (EPA) in the Washington, D.C. area have expressed concerns about air quality and work environment discomforts. As part of a large-scale study of health and comfort concerns, environmental monitoring was carried out in March 1989 at approximately 100 sites (rooms) within these buildings. Employees in the vicinity of the monitors were administered a brief questionnaire to elicit information regarding their work environment, comfort levels, odors noticed, health symptoms, mood states, and perceptions of overall air quality. Statistical analyses were carried out for the 191 males and the 192 females for whom both questionnaire and monitoring data were available. The analyses entailed estimation of linear regression and logistic regression models aimed at testing for associations between the employees' responses and the environmental measurements, which included temperature, humidity, carbon dioxide, and particlate concentrations (100 sites), and various microbiologic and volatile organic compound concentrations (subset of 56 sites). Principal component analyses were used to develop some of the outcome and explanatory variables used in the models. In the paper, the authors describe the study design, the study limitations, the statistical models and methods, and the results and implications of the data analysis.

Keywords: *Indoor air pollution, *Federal buildings, *Air quality, *Occupational safety and health, *Environmental surveys, Work environments, US EPA, Occupational exposure, Working conditions, Air pollution monitoring, Concentration(Composition), Environmental engineering, Odors, Questionnaries, Statistical analysis, Personnel, Mathematical models, Regression analysis.

PB91-213587/REB PC **A03/MF A01**
Assessment of Neurotoxicity Using Assays of Neuron- and Glia- Localized Proteins: Chronology and Critique.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
J. P. O'Callaghan. 1991, 48p EPA/600/D-91/126

The achievements in neuroscience research over recent years have greatly advanced the authors' understanding of nervous system structure and function. Yet, with each increment in knowledge, the realization of the overwhelming complexity of this organ system is evident. Gone are the days when the brain can be viewed as a complexly wired collection of a few neuronal cell types surrounded by an apparently inert contingent of supporting glia. It is now known that neurons exist in a seemingly endless array of subtypes, each of which has been revealed by the presence of an identifying constituent. Classically, these cell type 'markers' took the form of specific neurotransmitter/neuromodulator candidates. More recently, these neuron-specific tags have grown to encompass an enormous number of well characterized peptides and macromolecules. That glia also exist as a large collection of specific subtypes, each with a potentially unique function, has only recently been appreciated. These recent advances in neuroscience have now enabled scientists to utilize nerve cells and neuroglia and their associated proteins, to develop meaningful neurotoxicological assays and methods of studying important neuroregulators.

Keywords: *Neuroglia, *Toxicity, *Central nervous system, *Neurons, Neuroregulators, Toxic substances, Test methods, Messenger RNA, Polyacrylamide gel electrophoresis, Enzyme-linked immunosorbent assay, Glial acidic fibrillary protein, Encephalitogenic basic proteins, Aging, Hyperplasia.

PB91-213595/REB PC **A02/MF A01**
Palatal Expression of TGFbeta Isoforms in Normal and Retinoic Acid-Treated Embryos.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
D. R. FitzPatrick, B. D. Abbott, and R. J. Akhurst. 1991, 10p EPA/600/D-91/127
Portions of this document are not fully legible. Prepared in cooperation with Glasgow Univ. (Scotland). Duncan Guthrie Inst. of Medical Genetics.

Recinoic Acid (RA) is know to induce cleft palate in all mammalian species tested. The etiology of RA-induced cleft palate has been extensively investigated in C57B16 mouse embryos. Recently shown was distinct site- and stage-specific expression pattern of the RNAs encoding the three TGFbeta isoforms (TGFbeta1, TGFbeta2 and TGFbeta3) during normal murine palatogenesis suggesting an important role for these regulators of cell function in this developmental process. TGFbeta1 and TGFbeta3 are expressed in the medial edge epithelium at the time of palatal fusion, whereas TGFbeta2 RNA is exclusively mesenchymal. The present study investigated the expression of TGFbetas in mouse embryo palates from mothers treated in vivo with 100mg/Kg all-trans RA on day 10 post coitum (p.c.) and collected on day 12 and day 14 p.c. The RA-treated embryos showed marked hypoplasia of the palatal shelves but, surprisingly, did not show any major alteration in the RNA localization of TGFbeta1 or TGFbeta3. There were, however, minor changes in the expression characteristics of TGFbeta2 RNA.

Keywords: *Retinoic acid, *Transforming growth factors, *Embryo, Cleft palate, Ribonucleic acids, Prenatal exposure delayed effects, Immunohistochemistry, In vivo analysis.

PB91-213603/REB PC **A02/MF A01**
Evaluation of High Volume Particle Sampling and Sample Handling Protocols for Ambient Urban Air Mutagenicity Determinations. Symposium paper.
Health Effects Research Lab., Research Triangle Park, NC.
R. R. Watts, A. J. Hoffman, M. C. Wilkins, D. E. House, and R. M. Burton. 5 Jan 91, 9p EPA/600/D-91/128
Presented at the 1991 EPA/A and WMA symposium 'Measurement of Toxic and Related Air Pollutants'. Prepared in cooperation with Environmental Health Research and Testing, Inc., Research Triangle Park, NC.

An investigation of high volume particle sampling and sample handling procedures was undertaken to evaluate variations of protocols being used by the U.S. Environmental Protection Agency. These protocols are used in urban ambient air studies which collect ambient and source samples for subsequent mutagenicity analysis of the organic extracts of the aerosol fraction. Specific protocol issues investigated include: (1) duration of sampling period, (2) type of filter media used to collect air particles, (3) necessity for cryogenic field site storage and Dry Ice shipping of filter samples, and (4) sample handling at the receiving laboratory. Results indicate that the sample handling variations and collection period variables had no significant effect on recovery of organics or mutagens. However, a filter type difference was observed. The recovery of organics and mutagens was significantly greater for teflon impregnated glass fiber filters than for glass fiber or quartz. Results from a second phase of study indicated differences in extraction efficiencies for these filter types.

Keywords: *Air sampling, *Mutagens, *Urban areas, *Evaluation, Air pollution monitoring, Filters, Organic compounds, *High volume particle sampling, *Durham(North Carolina).

PB91-213611/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Behaviour of Metals in Municipal Sludge Incinerators. Journal article.
Energy and Environmental Research Corp., Irvine, CA.
R. G. Barton, W. R. Seeker, and H. E. Bostian. c1991, 11p EPA/600/J-91/130
Contract EPA-68-03-3365
Pub. in Process Safety and Environmental Protection, TransIChemE, v69 ptB p29-36 Feb 91. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The emission of toxic metals from sewage sludge incinerators can present a risk to human health and the environment. A significant base of data on the behavior of metals in sludge incinerators has been compiled. These data were examined in detail to identify the mechanisms responsible for metals emissions and determine the effect of key operating parameters. The primary metals escape mechanism identified involved the vaporization of metals in the combustion zone and subsequent condensation in the exhaust system. The process significantly increases the concentration of toxic metals on submicron particles. Combustion chamber temperature was found to have a strong effect on metals emissions. No relationship could be observed between total particulate emissions and metals emissions.

Keywords: *Sewage sludge, *Sludge disposal, *Metals, *Air pollution control, *Incineration, *Computerized simulation, Combustion products, Particles, Temperature dependence, Field tests, Performance evaluation, Toxic substances, Mathematical models, Waste disposal, Operation, Condensation reactions, Vaporization, Incinerators, Chemical reaction mechanisms.

PB91-213629/REB PC **A03/MF A01**
Cardiopathic Effect of 1,2,3-Trichloropropane after Subacute and Subchronic Exposure in Rats. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.

B. A. Merrick, M. Robinson, and L. W. Condie. c1991, 11p EPA/600/J-91/131
Pub. in Jnl. of Applied Toxicology, v11 n3 p179-187 1991.

1,2,3-Trichloropropane (1,2,3-TCP) is an industrial water contaminant with potential for human exposure by the oral route. The systemic toxicology of 1,2,3-TCP was evaluated after subacute or subchronic exposure in male and female Sprague-Dawley rats. Animals were treated with 0.01, 0.05, 0.20 and 0.80 mmol per kg per day for 10 days and 0.01, 0.05, 0.10 and 0.40 mmol per kg per day for 90 days. Chemical exposure was by oral gavage in corn oil. Lethality did not occur in either study. Toxicity was observed primarily in the high dose group of subacute and subchronically treated rats of both sexes. The primary histological finding in the study was an inflammation-associated cardiopathy produced by 1,2,3-TCP. Myocardial necrosis and degeneration occurred in a diffuse pattern with marked eosinophilia of affected cells. Male and female animals showed a cardiopathic response only at a dose of 0.8 mmol per kg 1,2,3-TCP after the 0-day exposure. In the subchronic study, the incidence of cardiopathy was more prevalent in males than in females. In addition to cardiac effects, the 90-day chemical exposure produced bile duct hyperplasia in 40% and 80% of males and females, respectively. The observation may be significant, since five other neoplastic and proliferative lesions were observed in rats receiving 1,2,3-TCP subchronically. Thus, the study demonstrates that heart and liver were target organs for 1,2,3-TCP toxicity and suggests that 1,2,3-TCP exposure may be involved in carcinogenesis.

Keywords: *Water pollution effects(Animals), *Toxicology, *Myocardium, Rats, Blood chemical analysis, Organ weight, Body weight, Pathology, Thymus gland, Liver, Spleen, Eosinophils, Reprints, *Trichloropropanes.

PB91-213637/REB PC **A02**/MF **A01**
Public Health Service, Rockville, MD.
Nuclear and Axonal Localization of Ca(2+)/Calmodulin-Dependent Protein Kinase Type Gr in Rat Cerebellar Cortex. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
K. F. Jensen, C. A. Ohmstede, R. S. Fisher, and N. Sahyoun. c1991, 6p EPA/600/J-91/132
Grants PHS-HD05958, PHS-NS24596
Pub. in Proceedings of the National Academy of Sciences, v88 p2850-2853 Apr 91. See also PB91-213652. Prepared in cooperation with Wellcome Research Labs., Research Triangle Park, NC., and California Univ., Los Angeles. School of Medicine. Sponsored by Public Health Service, Rockville, MD.

The granule cell enriched Ca(2+)/calmodulin dependent protein kinase (Cam kinase-Gr) may serve as a calcium activated switch involved in neuronal communication. To investigate its potential sites of action the authors characterized its subcellular distribution within the cerebellum by immunochemistry and electron microscopy. Enzyme immunoreactivity is prominent in the nuclei of granule cells where it is preferentially associated with regions of dispersed chromatin. Cam kinase-Gr is also evident in the axons of granule cells and present to a lesser extent in the cytoplasm and dendrites of these neurons. Based on its subcellular distribution, Cam kinase-Gr provides particular neuronal populations with a coordinated CA(2+)-signalling pathway which may regulate several aspects of neuronal function.

Keywords: *Axons, *Calcium, *Calmodulin, *Protein kinases, *Cerebral cortex, Immunohistochemistry, Chromatin, Rats, Electron microscopy, Western blotting, Reprints.

PB91-213645/REB PC **A02**/MF **A01**
In vivo and in vitro Structure-Dosimetry-Activity Relationships of Substituted Phenols in Developmental Toxicity Assays. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
R. J. Kavlock, L. A. Oglesby, L. L. Hall, H. L. Fisher, and F. Copeland. c1991, 7p EPA/600/J-91/133
Pub. in Reproductive Toxicology, v5 n3 p255-258 Jun 91.

Structure-dosimetry-activity relationships (SDARs) of a series of substituted phenols were evaluated following exposure of gestation day 11 rats in vivo and in comparable stage embryos in vitro. In the in vivo study, 27 congeners were assayed and log P and Hammett sigma values (a measure of the electronic withdrawing ability of the substituent) were shown to correlate with maternal toxicity; however, no relationships between these parameters and developmental effects were observed. In the in vitro system, 13 congeners were evaluated and molar refractivity and/or lipophilicity were shown to correlate with the ability of the phenols to induce embryonic growth retardation and structural defects in the absence of the hepatocytes. In contrast, when a metabolic activating system (primary hepatocytes) was present in the in vitro system, the potential to induce growth retardation was inversely related to lipophilicity, although the relationships were weaker than the positive relationship seen without the hepatocytes. The binding of the phenols to macromolecules in the culture medium was highly correlated with log P. In summary, a systematic study of the response of in vivo and in vitro embryos to a series of structural analogues was conducted, and it attempted to relate the potency of the congeners to specific physicochemical properties. While different conclusions were reached about the potency of the phenols in the two systems, the assessment of pharmacokinetic parameters provided insight into the deposition and activity of these congeners in the embryo and have pointed us in the direction of determining the reason(s) for the differences that were observed.

Keywords: *Toxicity, *Teratogens, *Phenols, In vivo analysis, In vitro analysis, Structure-activity relationships, Embryo, Cultured cells, Metabolic activation, Liver, Reprints.

PB91-213652/REB PC **A02**/MF **A01**
Public Health Service, Rockville, MD.
Acquisition and Loss of a Neuronal Ca(2+)/Calmodulin-Dependent Protein Kinase during Neuronal Differentiation. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
K. F. Jensen, C. A. Ohmstede, R. S. Fisher, J. K. Olin, and N. Sahyoun. c1991, 6p EPA/600/J-91/134
Grants PHS-HD05958, PHS-NS24596
Pub. in Proceedings of the National Academy of Science, v88 p4050-4053 May 91. See also PB91-213637. Prepared in cooperation with Wellcome Research Labs., Research Triangle Park, NC., California Univ., Los Angeles. School of Medicine, and NSI Technology Services Corp., Research Triangle Park, NC. Sponsored by Public Health Service, Rockville, MD.

Calcium ions play a critical role in neural development. Insights into the ontogeny of Ca(2+)-signaling pathways were gained by investigating the developmental expression of granule cell-enriched Ca(2+)/calmodulin-dependent protein kinase (CaM kinase-Gr) in the cerebellum and hippocampus of the rat. Neurons of these brain regions displayed characteristic schedules by which they acquired and displayed characteristic schedules by which they acquired and lost CaM kinase-Gr during differentiation. In the cerebellum, granule cells did not begin to express CaM kinase-Gr until after birth when they migrated into the granule cell layer, and the expression persisted in the adult. Purkinje cells expressed CaM kinase-Gr prenatally and lost this expression by postnatal day 14. In contrast, the granule and pyramidal cells of the hippocampus expressed the enzyme prenatally and in the adult.

Keywords: *Neurons, *Calcium, *Calmodulin, *Protein kinases, Hippocampus, Cerebellum, Purkinje cells, Immunohistochemistry, Western blotting, Electron microscopy, Reprints.

PB91-213660/REB PC **A08**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Landfill Leachate Clogging of Geotextile (and Soil) Filters.
Drexel Univ., Philadelphia, PA. Geosynthetic Research Inst.
R. M. Koerner, and G. R. Koerner. Jul 91, 160p EPA/600/2-91/025
Grant EPA-R81-14965
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The primary leachate collection system of most solid waste landfills contains a filter layer which has historically been a granular soil. Recently, however, various types of geotextile filters have been used to replace the natural soil filters. A project using six different landfill leachates and aimed at investigating the functioning of different geotextile filters is the focus of this 36 month long study. The initial 12 months, referred to as Phase I, investigated flow rates in various filters under aerobic conditions at six different landfill sites using the site-specific leachates. The study inadvertently found that the overlying granular soil clogged as much as the geotextile filter that was located downstream. The effects of different types and styles of geotextiles was generally masked by the upstream soil clogging. An important finding in this task was the biodegradation of the geotextiles was not evidenced and was concluded to be a non-issue. The subsequent 24 months of study, referred to as Phase II(a), led to the development of a vastly improved flow rate monitoring device. In a separate task, referred to as Phase II(b) and conducted simultaneously with Phase II(a), biocide treated geosynthetics were utilized at the two sites with the most aggressive leachates. While the biocides may have been effective in killing microorganisms, the remnants were as troublesome as the viable bacteria in creating subsequent clogging.

Keywords: *Earth fills, *Land pollution control, *Solid waste disposal, *Filters, *Hazardous materials, *Geotechnical fabrics, Leaching, Performance evaluation, Biological effects, Anaerobic processes, Flow rate, Collection, Soil filters, Aerobic processes, *Geosynthetic materials.

PB91-213678/REB PC **A04**/MF **A01**
Health and Environmental Effects Document for Adiponitrile.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Nov 87, 52p EPA/600/8-89/021

The Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment has investigated the health and environmental effects for adiponitrile. Several quantitative toxicological estimates are presented that reflect evaluations of the substance's potential effects to human health, aquatic life, and the environment. Environmental fate and transport data are provided for air, soil, and water. Additionally, exposure levels are reported for the substance's presence in water, air, food, and potential dermal contact. Results of pharmacokinetic evaluations and carcinogenicity risk assessments are also provided.

Keywords: *Adiponitrile, *Environmental pollutants, *Toxicity, *Health hazards, Carcinogenicity tests, Mutagenicity tests, Metabolism, Pharmacokinetics, Air pollutants, Soil contamination, Laboratory animals, Teratogens, Reproduction(Biology), Biodeterioration, Aquatic biology, Environmental exposure pathways, Water pollutants, CAS 111-69-3.

PB91-213686/REB PC **A06**/MF **A02**
Health and Environmental Effects Document for Benzoic Acid.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Jul 87, 105p EPA/600/8-89/027

The Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment has investigated the health and environmental effects for benzoic acid. Several quantitative toxicological estimates are presented that reflect evaluations of the substance's potential effects to human health, aquatic life, and the environment. Environmental fate and transport data are provided for air, soil, and water. Additionally, exposure levels are reported for the substance's presence in water, air, food, and potential dermal contact. Results of pharmacokinetic evaluations and carcinogenicity risk assessments are also provided.

Keywords: *Benzoic acids, *Environmental pollutants, *Toxicity, *Health hazards, Carcinogenicity tests, Laboratory animals, Metabolism, Pharmacokinetics, Air pollutants, Water pollutants, Soil contamination, Mutagenicity tests, Teratogens, Reproduction(Biology), Biodeterioration, Aquatic biology, Environmental exposure pathways, CAS 65-85-0.

PB91-213694/REB PC **A06**/MF **A02**
Health and Environmental Effects Document for Benzyl Alcohol.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Sep 89, 107p EPA/600/8-90/033

The Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment has investigated the health and environmental effects for benzyl alcohol. Several quantitative toxicological estimates are presented that reflect evaluations of the substance's potential effects to human health, aquatic life, and the environment. Environmental fate and transport data are provided for air, soil, and water. Additionally, exposure levels are reported for the substance's presence in water, air, food, and potential dermal contact. Results of pharmacokinetic evaluations and carcinogenicity risk assessments are also provided.

Keywords: *Benzyl alcohols, *Environmental pollutants, *Toxicity, *Health hazards, Carcinogenicity tests, Laboratory animals, Metabolism, Pharmacokinetics, Air pollutants, Water pollutants, Soil contamination, Chemical reactions, Mutagenicity tests, Teratogens, Reproduction(Biology), Biodeterioration, Aquatic biology, Environmental exposure pathways, CAS 100-51-6.

PB91-213702/REB PC **A05**/MF **A02**
Health and Environmental Effects Document for Bromochloromethane.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
May 90, 100p EPA/600/8-91/016

The Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment has investigated the health and environmental effects for bromochloromethane. Several quantitative toxicological estimates are presented that reflect evaluations of the substance's potential effects to human health, aquatic life, and the environment. Environmental fate and transport data are provided for air, soil, and water. Additionally, exposure levels are reported for the substance's presence in water, air, food, and potential dermal contact. Results of pharmacokinetic evaluations and carcinogenicity risk assessments are also provided.

Keywords: *Environmental pollutants, *Toxicity, *Health hazards, Carcinogenicity tests, Mutagenicity tests, Laboratory animals, Metabolism, Pharmacokinetics, Air pollutants, Water pollutants, Soil contamination, Terrestrial ecosystems, Teratogens, Reproduction(Biology), Biodeterioration, Aquatic biology, Environmental exposure pathways, *Bromochloromethane, CAS 74-97-5.

PB91-213777/REB PC **A02**/MF **A01**
EPA Pesticide Fact Sheet No. 224: Uniconazole-P.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
3 Jul 91, 10p EPA/540/FS-91/138

The document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on uniconazole-P, or herbicides. A Fact Sheet is issued after one of the following actions has occurred: Issuance or reissuance of a registration standard, Issuance of each special review document, Registration of a significantly changed use pattern, Registration of a new chemical, or An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

Keywords: *Pesticides, *Herbicides, *Toxic substances, Hazardous materials, Physical properties, Regulations, Toxicology, Ecology, Agricultural products, *Uniconazole-P, Path of pollutants, Chemical information fact sheet, Use patterns, Science findings, CAS 83657-17-4.

PB91-213819/REB PC **A04**/MF **A01**
Exxon Valdez Oil Spill. A Report to the President.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
May 89, 75p* OERR-9360.8-03
Prepared in cooperation with Department of Transportation, Washington, DC. Office of the Secretary, and National Response Team, Washington, DC.

Prepared by the National Response Team, the report was requested by the President and undertaken by Secretary of Transportation Samuel K. Skinner and Environmental Protection Agency Administrator William K. Reilly. The report addresses the preparedness for, the response to, and early lessons learned from the Exxon Valdez incident. The President has also asked Secretary Skinner to coordinate the efforts of all federal agencies involved in the cleanup and Administrator Reilly to coordinate the long-term recovery of the affected areas of the Alaskan environment. The efforts are ongoing.

Keywords: *Oil spills, *Water pollution effects, *Prince William Sound, *Oil pollution, Environmental effects, Land pollution, Economic impact, Emergency plans, Contingency planning, Alaska, Cargo ships, Transportation safety, Energy shortages, Liabilities, Cost repayment, Compensation, Health risks, Responses, Recommendations, *Exxon Valdez, *Cleanup operations, Lessons learned.

PB91-213827/REB PC **A03**/MF **A01**
Field Standard Operating Procedures for Establishing Work Zones (F.S.O.P. 6).
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
1 Apr 85, 23p OSWER DIRECTIVE-9285.2-04

The directive describes procedures to be used by field personnel in establishing work zones for control of hazardous materials to minimize the risk of exposure to workers at hazardous release sites.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Risk assessment, *Occupational safety and health, Field tests, Operations, Air pollution sampling, Concentration(Composition), Work environments, Personnel, Occupational exposure, Protective equipment, Standards, *Office of Solid Waste and Emergency Response.

PB91-213835/REB PC **A03**/MF **A01**
Field Standard Operating Procedures for Preparation of a Site Safety Plan F.S.O.P. No. 9.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
1 Apr 85, 30p EPA/9285.2-05, OSWER DIRECTIVE-9285.2-05

The directive establishes requirements for protecting health and safety of field personnel during all activities conducted at the site of an incident. The manual contains safety information, instructions, and procedures to cover a variety of situations commonly encountered in this type of field work.

Keywords: *Occupational safety and health, *Superfund, *Waste management, *Hazardous materials, *Risk assessment, Safety measures, Personnel, Working conditions, Operations, Standards, Requirements, Management planning, Implementation, Emergency plans, Occupational exposure, *Office of Solid Waste and Emergency Response.

PB91-213843/REB PC **A03**/MF **A01**
Field Standard Operating Procedures for Air Surveillance F.S.O.P. No. 8.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1 Jan 85, 27p EPA/9285.2-03, OSWER DIRECTIVE-9285.2-03

The directive describes air monitoring procedures for use by field personnel in obtaining air monitoring data required to minimize the risk of exposure to personnel at hazardous substance release sites.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Occupational safety and health, *Air pollution monitoring, *Risk assessment, Operations, Procedures, Field tests, Occupational exposure, Concentration(Composition), Aerial surveys, US EPA, Asbestos, Data processing, Emergency plans, *Office of Solid Waste and Emergency Response.

PB91-213850/REB PC **A03**/MF **A01**
Field Standard Operating Procedures for the Decontamination of Response Personnel F.S.O.P. No. 7.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1 Jan 85, 33p EPA/9285.2-02, OSWER DIRECTIVE-9285.2-02

The directive describes approved operating procedures for decontamination of response personnel and equipment at hazardous substance release sites.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Decontamination, *Occupational safety and health, *Equipment, Risk assessment, Operations, Field tests, Procedures, Protective equipment, Tools, Samplers, Containers, *Office of Solid Waste and Emergency Response.

PB91-213868/REB PC **A06**/MF **A02**
Oil Spill Prevention, Control, and Countermeasures Program. Task Force Report. Interim rept. (Final).
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
13 May 88, 104p OERR-9360.8-02

The study was initiated in response to the January 2, 1988, release of approximately one million gallons of diesel fuel from the Ashland Oil Facility in Floreffe, PA, and the subsequent contamination of the Monongahela and the Ohio Rivers. The spill was caused by the tank flowed over the surrounding dike and found its way into the Monongahela and Ohio Rivers. As a result of the spill, fifteen water intakes were shut down, water supplies to over 2.7 million residents were disrupted, schools and businesses were closed, and thousands of fish and waterfowl were destroyed.

Keywords: *Oil spills, *Water pollution control, *Water pollution abatement, *Contingency planning, Monongahela River, Ohio River, Emergency plans, Oil pollution, Management planning, Pollution regulations, State implementation plans, Inspection, Regulations, Implementation, Reviews, Legislation, Recommendations, Standards, Floreffe(Pennsylvania), Clean Water Act.

PB91-214072/REB PC **A03**/MF **A01**
Memorandum of Understanding between the Federal Emergency Management Agency and EPA for the Implementation of CERCLA Relocation Activities under P.L. 96.510 (CERCLA) 9295.5.01. Directive.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
8 Apr 85, 20p EPA/9295.5-01

The directive discusses an agreement, between EPA and the Federal Emergency Management Agency (FEMA), that describes major responsibilities of both agencies. It also outlines areas of mutual support and cooperation relating to relocation activities associated with response actions pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980; Executive Order 12316; and the National Oil and Hazardous Substance Pollution Contingency Plan, 40 CFR Part 300.

Keywords: *Superfund, *Waste management, *Hazardous materials, Interagency cooperation, US EPA, Remedial action, Information dissemination, Implementation, Relocation, Cost repayment, Administrative procedures, *Office of Solid Waste and Emergency Response, Cooperative agreements, Federal Emergency Management Agency, Comprehensive Environmental Response Compensation and Liability Act.

PB91-214080/REB PC **A03**/MF **A01**
Guidance for Coordinating ATSDR Health Assessment Activities with the Superfund Remedial Process. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
22 Apr 87, 24p OSWER DIRECTIVE-9285.4-02

The directive discusses SARA which mandates that the Agency for Toxic Substances and Disease Registry (ATSDR) perform specific public health activities associated with actual or potential exposure to toxic substances identified at hazardous waste sites. The document (1) provides guidance to support ATSDR in meeting its health assessment requirements as outlined in Section 110 under SARA; (2) summarizes the various EPA response activities for which consultation with ATSDR may be requested; and (3) outlines ATSDR's management process for citizen petitions.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Toxic substances, *Public health, Guidelines, Risk assessment, Remedial action, Interagency cooperation, US EPA, Citizen participation, Administrative procedures, Exposure, *Office of Solid Waste and Emergency Response, Agency for Toxic Substances and Disease Registry.

PB91-214098/REB PC **A03**/MF **A01**
CERCLA Compliance with Other Environmental Statutes. Directive.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
2 Oct 85, 22p EPA/9234.0-02
Portions of this document are not fully legible.

The directive sets forth the Environmental Protection Agency (EPA) policy on the applicability of the standards, criteria, advisories, and guidance of other State and Federal environmental and public health statutes to actions taken pursuant to sections 104 and 106 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). The policy addresses considerations for on-site and off-site actions taken under CERCLA.

Keywords: *Superfund, *Waste management, *Hazardous materials, Environmental policy, US EPA, Pollution standards, On-site investigations, Guidelines, Public health, Compliance, Remedial action, Law enforcement, *Office of Emergency and Remedial Response, Comprehensive Environmental Response Compensation and Liability Act, Remedial response.

PB91-214106/REB PC **A03**/MF **A01**
Superfund Remedial Program Financial Management Authority, Responsibilities and Procedures. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
21 Sep 84, 28p OSWER DIRECTIVE-9275.2-01

The directive discusses the Superfund delegations approved April 16, 1984, the Regional Offices have additional authority and responsibilities for significant portions of the remedial program. This includes both programmatic and administrative authority and responsibilities, described in detail in the various Superfund remedial program guidance packages, and specific financial management authority, responsibilities and procedures described in the document.

Keywords: *Superfund, *Waste management, *Hazardous materials, Remedial action, Financial management, Authority, Administrative procedures, Guidelines, Regional analysis, *Office of Solid Waste and Emergency Response, Responsibilities.

PB91-214114/REB PC **A01**/MF **A01**
Interagency Agreement between the Corps of Engineers and EPA in Executing P.L. 96.510 (CERCLA). Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
3 Dec 84, 5p OSWER DIRECTIVE-9295.2-03

The directive discusses that EPA has overall statutory responsibility for implementing the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), also known as Superfund. The agreement defines the assistance the U.S. Army Corps of Engineers will provide to EPA in implementing the Superfund program, for EPA Fund-lead or State Fund-lead or for EPA enforcement-lead projects.

Keywords: *Superfund, *Waste management, *Hazardous materials, Corps of Engineers, US EPA, Interagency cooperation, Funds, Pollution regulations, Implementation, Authority, Remedial action, *Office of Solid Waste and Emergency Response, Comprehensive Environmental Response Compensation and Liability Act, Cooperative agreements, Responsibities, Remedial response.

PB91-214122/REB PC **A01**/MF **A01**
Superfund LDR Guide No. 7. Determining When Land Disposal Restrictions (LDRs) Are Relevant and Appropriate to CERCLA Response Actions. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Dec 89, 4p OSWER-9347.3-08FS

See also PB91-921327.

The Fact Sheet outlines the process used to determine whether the Resource Conservation and Recovery Act (RCRA) land disposal restrictions (LDRs) established under the Hazardous and Solid Waste Amendments (HSWA) are 'relevant and appropriate' to an on-site CERCLA response action.

Keywords: *Superfund, *Waste management, *Hazardous materials, Ground disposal, On-site investigations, Remedial action, Best technology, Waste disposal, Pollution regulations, Standards compliance, *Office of Solid Waste and Emergency Response, Remedial response, Resource Conservation and Recovery Act, Land Disposal Restrictions, Comprehensive Environmental Response Compensation and Liability Act.

PB91-214130/REB PC **A03**/MF **A01**
Superfund Removal Program. Financial Management Authority, Responsibilities and Procedures. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
11 Jul 84, 34p EPA/9275.1-01

The directive describes removal approval, funding, and document processing in detail.

Keywords: *Superfund, *Waste management, *Hazardous materials, Remedial action, Funds, Authority, Administrative procedures, Financial management, *Office of Solid Waste and Emergency Response.

PB91-214148/REB PC **A02**/MF **A01**
Political Subdivision-Lead for Remedial Response. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1 May 89, 9p EPA/9375.5-03
Portions of this document are not fully legible.

The directive discusses guidance to Regions, States, and political subdivisions thereof, on the designation of a political subdivision as the lead agency for remedial response under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). The guidance applies to Fund-financed remedial response only and does not apply to pre-remedial, removal, or enforcement activities.

Keywords: *Superfund, *Waste management, *Hazardous materials, Guidelines, Funds, Financing, Remedial action, Contracts, *Office of Solid Waste and Emergency Response, Political subdivisions, Cooperative agreements, Remedial response, Responsibilities, Remedial designs.

PB91-214155/REB PC **A02**/MF **A01**
Flexibility in the FY 1988 Superfund Regional Extramural Operating Plan. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
7 Jun 88, 7p EPA/9200.3-05

The directive purpose is to discuss current planning and fund control processes, to clarify the funding flexibility presently available to the Regions, and to establish additional funding flexibility principles for the remainder of FY 1988.

Keywords: *Superfund, *Waste management, *Hazardous materials, Funds, Financial management, Remedial action, Regional analysis, Management planning, Operations, Implementation, *Office of Solid Waste and Emergency Response, Resign designs, National Priorities List.

PB91-214163/REB PC **A13**/MF **A03**
Technical Assistance Team (TAT) Contracts. Users' Manual.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Sep 87, 296p OSWER DIRECTIVE-9242.4-01A

The users' manual provides information and guidance on management and implementation of EPA's 'Technical Assistance Team (TAT) for Emergency Response, Removal, and Prevention' contracts. Its primary purpose is to assist Regional and Headquarters EPA personnel in understanding their roles and responsibilities under the contracts and to describe the necessary procedures and requirements that should be followed in managing the contracts. The manual is also intended to be helpful to TAT contractor personnel in terms of their roles and responsibilities vis-a-vis EPA.

Keywords: *Technical assistance, *Contract management, Manuals, Emergencies, Response, Removal, Prevention, Requirements, Socioeconomic conditions, Program management, Financial management, Performance evaluation, Fees, Superfund, USA EPA, EPA Regions, Clean up.

PB91-214171/REB PC **A05**/MF **A01**
Assurance of Hazardous Waste Capacity, Guidance to State Officials. Assistance in Fulfilling the Requirements of CERCLA 104(c)(9). Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Dec 88, 81p OSWER DIRECTIVE-9010.00

The document supplies guidance to state officials on providing assurances required by Section 104(c)(9) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended ('CERCLA' or 'Superfund'). This section of CERCLA requires states in which remedial actions may be taken to provide assurances, prior to EPA taking or funding such actions, of the availability of hazardous waste treatment or disposal facilities which have adequate capacity to manage the hazardous wastes expected within the state over twenty years. The Guidance Document reflects EPA's current understanding of the statutory requirements and describes how EPA currently suggests that states implement these requirements. The guidance provides substantial information to states, including suggested language for the contracts and cooperative agreements to be signed, instructions on the preparation of state Capacity Assurance Plans (CAPs) that can form a basis for the assurances, and a model for the interstate agreements or regional agreement or authority required when addressing access to capacity in other states.

Keywords: *Superfund, *Waste management, *Hazardous materials, Capacity, Load management, Remedial action, Requirements, Authority, Guidelines, Mathematical models, Forecasting, State officials, *Office of Solid Waste and Emergency Response, Cooperative agreements, Capacity Assurance Plans, Comprehensive Environmental Response Compensation and Liability Act.

PB91-214189/REB PC **A03**/MF **A01**
Establishing a Construction Pipeline. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
19 Dec 89, 14p OSWER DIRECTIVE-9200.3-09

The purpose of the directive is to re-emphasize the importance of completing activities to assure FY 90 remedial actions (RAs) are funded in a timely manner. The attachment, dated December 7, 1989, entitled 'FY 90 Remedial Action Advice of Allowance and Maintenance of a Queue,' also includes background and implementation information for EPA regional offices and the RA prioritization fact sheet.

Keywords: *Superfund, *Waste management, *Hazardous materials, Remedial action, Funds, Financial management, Implementation, Pipelines, Maintenance, Construction, *Office of Solid Waste and Emergency Response, Remedial designs.

PB91-214197/REB PC **A05**/MF **A01**
Risk Assessment in Superfund: A Primer. First Edition, September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 87p EPA/540/X-91/002, OSWER-9285.7-05

The document is an introduction to risk assessment for Superfund Remedial Project Managers (RPMs) and On-Scene Coordinators (OSCs). This is an internal training document.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Risk assessment, Specialized training, Exposure, Toxicity, Remedial action, Environmental effects, Public health, Data processing, Site sur-

veys, *Office of Solid Waste and Emergency Response, Remedial Project Managers, On-Scene Coordinators.

PB91-214205/REB PC A03/MF A01
Consideration of RCRA Requirements in Performing CERCLA Responses at Mining Waste Sites. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
19 Aug 86, 13p EPA/9234.0-04
Portions of this document are not fully legible.

The directive discusses mining wastes which will not be regulated under Subtitle C of RCRA. Mining waste problems will be addressed by developing a program for regulation under Subtitle D. In the interim, Superfund will continue to address these mining waste problems through the RI/FS and ROD/EDD processes taking into account current Subtitle D requirements as well as options for addressing risks not addressed by Subtitle D requirements.

Keywords: *Superfund, *Waste management, *Mine wastes, *Hazardous materials, Pollution regulations, Feasibility studies, Legal aspects, Remedial action, Substitutes, Pollution standards, Risk assessment, Requirements, *Office of Solid Waste and Emergency Response, Preremedial actions, Record of Decision, Remedial response.

PB91-214213/REB PC A02/MF A01
Recommendations for Ground Water Remediation at the Millcreek, Pennsylvania Site. Directive.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
24 Mar 86, 8p OSWER DIRECTIVE-9283.1-01

The directive provides a preview of key features of forthcoming strategy for ground water cleanup at the Millcreek, PA site. Some of the areas covered are: (1) site description; (2) regional position on Millcreek; (3) position of potentially responsible parties (PRPs); and, (4) consistency of proposed Millcreek response action with OERR's ground water strategy.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Ground water, *Water pollution control, Remedial action, Environmental transport, Soil contamination, Earth fills, Site surveys, *Office of Solid Waste and Emergency Response, Cleanup operations, Millcreek(Pennsylvania), Potentially responsible parties, Remedial response.

PB91-214221/REB PC A03/MF A01
Role of Expedited Response Actions under SARA. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
21 Apr 87, 13p EPA/9360.0-15
Portions of this document are not fully legible.

The directive serves as a follow-up to OSWER Directive 9360.0-10 (July 8, 1986) entitled 'Expedited Response Actions,' and updates the basic tenets of expedited response actions (ERAs) and their role in the Superfund Remedial Program.

Keywords: *Superfund, *Waste management, *Hazardous materials, Remedial action, Procedures, Guidelines, Implementation, *Office of Solid Waste and Emergency Response, Remedial response, National Contingency Plan, National Priorities List.

PB91-214239/REB PC A03/MF A01
Regional Pre-Remedial Program Objectives for FY 89 and First Quarter of FY 90. Directive.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
10 Mar 89, 18p EPA/9345.2-02

The directive contains pre-remedial objectives for Regional offices during the transition period between proposal and promulgation of the revised Hazard Ranking System (HRS). The directive updates OSWER Directive 9345.2-01 and 'Pre-Remedial Priorities' -- memo from Longest to Division Directors, April 4, 1988.

Keywords: *Superfund, *Waste management, *Hazardous materials, Regional analysis, Ranking, Implementation, Standards compliance, Revisions, *Office of Solid Waste and Emergency Response, Preremedial actions, Hazardous Ranking System, National Priorities List.

PB91-214247/REB PC A03/MF A01
Model Program for Removal Site File Management. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jul 88, 22p OSWER DIRECTIVE-9360.2-01

The directive discusses a model program for site file management that provides a file structure for on-site file management and Regional file maintenance for use by On-Scene Coordinators (OSCs) and Regional administrative support staff. The guidance provides the minimum contents of a site file kit for use by OSCs and Techical Assistance Team personnel and/or administrative support staff when establishing a site file. Additionally, on-site and Regional office removal file management procedures are recommended as part of the guidance document.

Keywords: *Superfund, *Waste management, *Hazardous materials, On-site investigations, Guidelines, Remedial action, Cost repayment, Data processing, Information transfer, File maintenance(Computers), Files(Records), Administrative procedures, *Office of Solid Waste and Emergency Response, On-Scene Coordinators.

PB91-214254/REB PC A02/MF A01
Technical Assistance Grants Program Activities Prior to the Issuance of the Interim Final Rule. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
11 Jan 88, 7p OSWER DIRECTIVE-9230.1-02

The directive sets forth activities one can initiate prior to the issuance of the Techical Assistance Grant (TAG) Interim Final Rule (IFR) in early 1988. Given the short time before the issuance of the IFR, the Regional effort should focus on sites where the Remedial Investigation/Feasibility Study (RI/FS) is underway and citizen groups have expressed interest in TAGs.

Keywords: *Superfund, *Waste management, *Hazardous materials, Technical assistance, Financial assistance, Technology utilization, Regulations, Grants, Site surveys, Feasibility studies, Remedial action, Community relations, *Office of Solid Waste and Emergency Response, Preremedial action.

PB91-214262/REB PC A03/MF A01
FY 1987 Superfund Comprehensive Accomplishments Plan.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Oct 86, 11p OSWER DIRECTIVE-9200.3-03
See also PB90-204181.

The directive contains points for EPA Regions to consider while developing their Superfund Comprehensive Accomplishments Plan (SCAP) and contains charts showing preliminary SCAP/SPMS commitments for the Regions.

Keywords: *Superfund, *Waste management, *Hazardous materials, Comprehensive planning, Regional analysis, Remedial action, Tables(Data), *Office of Solid Waste and Emergency Response, Cleanup operations, US EPA Regions 1-10, Superfund Comprehensive Accomplishment Plan, SPMS targets, Preremedial actions.

PB91-214270/REB PC A03/MF A01
40 CFR Part 35 Subpart O, Cooperative Agreements and Superfund State Contracts for Superfund Response Actions. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
10 Mar 89, 30p OSWER DIRECTIVE-9375.5-01
Portions of this document are not fully legible.

The directive transmits 40 CFR Part 35 Subpart O, 'Cooperative Agreements and Superfund State Contracts for Superfund Response Actions,' and provides information on program operating procedures that have been affected by the subject Interim Final Rule. This is the first in a series of directives to carry the number 9375.5, which is guidance relating to State, political subdivision, and Federally-recognized Indian Tribe involvement in the Superfund program.

Keywords: *Superfund, *Waste management, *Hazardous materials, Contracts, Information transfer, Procedures, American Indians, Operations, Regulations, *Office of Solid Waste and Emergency Response, Remedial response, Cooperative agreements.

PB91-214288/REB PC A02/MF A01
Required Use of the Removal Cost Management System for All Removal Actions. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
17 Feb 89, 7p OSWER DIRECTIVE-9360.0-20

To improve Superfund cost management, the Directive requires the use of the Removal Cost Management System (RCMS), a computerized cost tracking system, for all future removal actions. It describes the background, functions of RCMS, removal cost management policy, and implementation procedures.

Keywords: *Superfund, *Waste management, *Hazardous materials, Remedial action, Cost analysis, Forecasting, Implementation, Cost estimates, Site surveys, *Office of Solid Waste and Emergency Response, *Removal Cost Management System.

PB91-214296/REB PC A13/MF A03
User's Guide to the Contract Laboratory Program.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Dec 86, 278p OSWER-9240.0-01A

The document was specifically prepared for the guidance and direction of program clients. The organic and inorganic analytical program descriptions herein outline the requirements and analytical procedures of the new CLP protocols developed from technical caucus recommendations. These protocols were implemented into CLP analysis contracts in 1985. Other analytical programs, procedures and documentation described herein reflect the status of the program as of July 1986.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Chemical analysis, Water pollution detection, Contractors, Guidelines, Implementation, Sampling, Land pollution, Water analysis, Cost effectiveness, Project management, Dioxins, Information services, Law enforcement, Quality assurance, *Office of Solid Waste and Emergency Response, *Contract Laboratory Program.

PB91-214304/REB PC A03/MF A01
Interim Final Guidance on Indian Involvement in the Superfund Program. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
18 Oct 89, 16p OSWER DIRECTIVE-9375.5-02

The directive provides guidance on the involvement of federally recognized Indian Tribes, which are treated substantially the same as States in the Superfund Program.

Keywords: *Superfund, *Waste management, *Hazardous materials, American Indians, Guidelines, Remedial action, Regulations, National government, Law enforcement, *Office of Solid Waste and Emergency Response, Preremedial actions, Remedial response, National Priorities List, Cooperative agreements.

PB91-214585/REB PC A09/MF A02
Clean Air Act Amendments of 1991: Detailed Summary of Titles.
Environmental Protection Agency, Washington, DC.
30 Nov 90, 181p*

Contents:
- Provisions for Attainment and Maintenance of National Ambient Air Quality Standards;
- Provisions Relating to Mobile Sources;
- Hazardous Air Pollutants;
- Acid Deposition Control;
- Permits;
- Stratospheric Ozone Protection;
- Provisions Relating to Enforcement;
- Miscellaneous Provisions;
- Clean Air Research;
- Disadvantaged Business Concerns;
- Clean Air Employment Transition Assistance.

Keywords: *Pollution laws, *Air pollution abatement, Acidification, Financial assistance, Alternative fuels, Air pollution control, National Ambient Air Quality Standards, Air pollution standards, State implementation plans, Ozone, Mobile pollutant sources, Permits, Standards compliance, Hazardous materials, Pollution regulations, Deposition, Air water interactions, Law enforcement, Stratosphere, Research and development, Emission factors, Employment, Exhaust emissions, Combustion products, Pollution sources, Acid rain, Air water interactions, Law enforcement, Stratosphere, Research and development, *Clean Air Act Amendments of 1990.

PB91-214940/REB PC **A03**/MF **A01**
Interim Guidance on Superfund Selection of Remedy. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
24 Dec 86, 13p EPA/9355.0-19

The directive discusses section 121 of the Superfund Amendments and Reauthorization Act (SARA) which addresses the cleanup standards for Superfund remedial actions. While the new statute retains the basic components of the existing Remedial Investigation/ Feasibility Study (RI/FS) and Record of Decision (ROD) process, the Section 121 provisions add some new requirements and special emphasis on certain issues. The guidance is intended to aid Regions in selecting remedial actions pending the Agency's upcoming revision of the National Contingency Plan (NCP).

Keywords: *Superfund, *Waste management, *Hazardous materials, Remedial action, Pollution standards, Feasibility studies, Requirements, Guidelines, Site characterization, Substitutes, *Office of Solid Waste and Emergency Response, Cleanup operations, Preremedial actions, Record of Decision, National contingency Plan.

PB91-214957/REB PC **A03**/MF **A01**
OERR Organizational Conflict of Interest Review and Approval Program (Superfund Management Review: Recommendation No. 46C). Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
31 Oct 89, 12p OSWER DIRECTIVE-9242.6-04

The directive transmits new procedures to eliminate organizational conflicts of interest in work assignments under Superfund Headquarters support contracts and to take appropriate steps to mitigate the perception of conflict wherever possible.

Keywords: *Superfund, *Waste management, *Hazardous materials, Administrative procedures, Contracts, Work, Organizational structure, Implementation, *Office of Solid Waste and Emergency Response, Work assignments.

PB91-214965/REB PC **A07**/MF **A02**
ARCS Work Assignment Management: Field Guide. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jan 89, 131p OSWER DIRECTIVE-9242.6-01

The ARCS Work Assignment management Field Guide is one of the three management-assistance tools currently available to help RPMs in carrying out their ARCS work assignment management duties. The guide is designed specifically for RPMs to provide them with quick reference information on the initiation and management of ARCS work assignments.

Keywords: *Superfund, *Waste management, *Hazardous materials, Guidelines, Management planning, Decision making, Field tests, Task analysis, Work, Forms(Paper), Contractors, Organizational structure, Standards, Zoning, *Office of Solid Waste and Emergency Response, *Alternative Remedial Contract Strategy, Work assignments, Remedial Project Managers.

PB91-214973/REB PC **A03**/MF **A01**
Land Disposal Restrictions as Relevant and Appropriate Requirements for CERCLA Contaminated Soil and Debris. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
5 Jun 89, 13p OSWER DIRECTIVE-9347.2-01

Until a rulemaking is completed that establishes treatment standards for soil and debris, OSWER has concluded that Land Disposal Restrictions (LDRs) generally should not be considered as relevant and appropriate for soil or debris that does not contain restricted RCRA wastes. The directive gives suggested language to be incorporated into feasibility study. For further clarification, the directive has included as an attachment, directive 9347.1-02.

Keywords: *Superfund, *Waste management, *Hazardous materials, Ground disposal, Soil treatment, Soil contamination, Waste treatment, Feasibility studies, Pollution regulations, Remedial action, *Land Disposal Restrictions, *Office of Solid Waste and Emergency Response, Resource Conservation and Recovery Act.

PB91-214981/REB PC **A04**/MF **A01**
RI/FS Streamlining. Directive.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
14 Feb 89, 51p OSWER DIRECTIVE09355.3-06

The directive presents a second set of recommendations for streamlining measures that will reduce the cost and duration of RI/FS's. Recommendations include those related to technical issues, procurement enhancement, program management, State coordination and enforcement.

Keywords: *Superfund, *Waste management, *Hazardous materials, Remedial action, Feasibility studies, Cost engineering, Project management, Law enforcement, Intergovernmental relationships, Procurement, Technology utilization, *Office of Solid Waste and Emergency Response.

PB91-214999/REB PC **A03**/MF **A01**
Data Handling Support for CERCLIS. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
4 Mar 86, 28p OSWER DIRECTIVE-9221.0-01

The directive implements policies and procedures regarding management of the data handling support for CERCLIS provided by the Computer Sciences Corporation (CSC).

Keywords: *Superfund, *Waste management, *Hazardous materials, Data processing, Information management, Procedures, Cost analysis, Data systems, Tables(Data), Wages, Labor estimates, *Office of Solid Waste and Emergency Response, Comprehensive Environmental Response Compensation and Liability Act.

PB91-215004/REB PC **A03**/MF **A01**
Implementation Strategy for Reauthorized Superfund: Short Term Priorities for Action. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
24 Oct 86, 25p OSWER DIRECTIVE-9200.3-02

On October 17, 1986, the President signed the Superfund Amendments and Reauthorization Act of 1986 (SARA) amending the current 'Superfund' law and enacting certain additional provisions. The attached transition guidance provides basic interpretations and instructions with respect to SARA.

Keywords: *Superfund, *Waste management, *Hazardous materials, Implementation, Pollution laws, Guidelines, Decisions and orders, Consent orders, Requirements, Remedial action, Performance standards, *Office of Solid Waste and Emergency Response, Record of Decision.

PB91-215012/REB PC **A02**/MF **A01**
Interim Guidance on Technical Assistance Grants. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
20 Mar 87, 6p OSWER DIRECTIVE-9230.1-01

The purpose of the directive is to describe a variety of issues involved in establishing the Technical Assistance Grants program and seek public input into the direction of that program.

Keywords: *Superfund, *Waste management, *Hazardous materials, Technical assistance, Guidelines, Grants, Financial assistance, Technology transfer, Public opinion, Citizen participation, Remedial action, Site surveys, *Office of Solid Waste and Emergency Response, National Priorities List.

PB91-215020/REB PC **A02**/MF **A01**
Guidance for Organizing ARCS Contract Files. Directive.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
3 Jan 89, 10p OSWER DIRECTIVE-9242.6-02

The directive provides instructions to the Regions for development of a consistent, yet flexible filing system for organizing and managing ARCS Contract files.

Keywords: *Superfund, *Waste management, *Hazardous materials, Standards, Guidelines, Contracts, Files(Records), Implementation, Management planning, Financing, *Office of Solid Waste and Emergency Response, Regional Project Managers.

PB91-215038/REB PC **A03**/MF **A01**
Pre-Remedial Strategy for Implementing SARA. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
12 Feb 88, 14p OSWER DIRECTIVE-9345.2-01

The directive establishes the strategy that the Environmental Protection Agency will follow to address the pre-remedial goals and requirements of the Superfund Amendments and Reauthorization Act (SARA) enacted on October 17, 1986.

Keywords: *Superfund, *Hazardous materials, *Waste management, Requirements, Standards, Ranking, Implementation, Pollution regulations, Management planning, *Office of Solid Waste and Emergency Response, Preremedial actions, Hazard Ranking System.

PB91-215053/REB PC **A02**/MF **A01**
Site-Specific Contracting for Removals. Directive.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
10 Apr 89, 6p OSWER DIRECTIVE-9242.2-02

The directive provides direction on the use of site-specific contracting in as many removal actions as circumstances allow and lists the criteria needed to do so.

Keywords: *Superfund, *Waste management, *Hazardous materials, Contracts, Remedial action, Site surveys, *Office of Solid Waste and Emergency Response.

PB91-215863/REB PC **A03**/MF **A01**
Evaluation of Camet Resistively Heated Metal Monolith Catalytic Converters on an M100 Neat Methanol-Fueled Vehicle. Part 3. Technical rept.
Environmental Protection Agency, Ann Arbor, MI. Control Technology and Applications Branch.
G. K. Piotrowski, and R. M. Schaefer. Jul 91, 35p EPA/AA/CTAB-91/03
See also Part 2, PB90-161209.

A low mileage resistively heated catalytic converter of a type furnished by the Camet Co. to automakers was evaluated on a methanol fueled vehicle. This converter was smaller in volume than typical three-way catalytic converters used on current model year vehicles of comparable engine displacement, and is designed specifically as a quick light-off catalyst (QLOC) by Camet. The report includes a description of the catalytic converters, description of the test vehicle, test procedures and analytical methods used.

Keywords: *Methanol, *Catalytic converters, *Automotive fuels, Catalysts, Engine tests, Exhaust emissions, Carbon monoxide, Formaldehyde, Nitrogen oxides, Motor vehicle engines.

PB91-216150/REB PC **A06**/MF **A02**
Report to Congress on Railroad Emissions: A Study Based On Existing Data. Final rept.
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
1 Jul 91, 124p EPA/460/3-91/01

Section 404 of the Clean Air Act Amendments of 1977 required the Environmental Protection Agency (EPA)

to conduct a study of emissions of air pollutants from railroad locomotives and secondary rolling stock power sources with respect to: (1) their environmental impact, (2) Methods for control, and (3) the status and effects of state regulations. The results of the study, together with recommendations on appropriate legislative action, were to be reported to the Congress. The report presents the results of the study performed by the EPA for five selected Air Quality Control Regions and the recommendations based upon the findings of the study. The report addresses the environmental impact of railroad emissions, the potential emission reduction techniques, and existing state and local regulations. Also included are background information and computational procedures employed. Also provided are the estimates of costs and cost effectiveness associated with the methods which were considered for reducing railroad emissions.

Keywords: *Air pollution, *Exhaust emissions, *Locomotives, *Railroads, Emission factors, Cost analysis, Air pollution control, Urban areas, Regulations, *Air quality control regions, Los Angeles(California), Kansas City(Missouri), Philadelphia(Pennsylvania), Chicago(Illinois), Saint Louis(Missouri).

PB91-216168/REB PC **A10**/MF **A03**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Regulatory and Inspection Manual for Nonmetallic Mineral Processing Plants.
IT Environmental Programs, Inc., Cincinnati, OH.
Apr 91, 225p EPA/340/1-90/010
Contract EPA-68-02-4466
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The document seeks to present the latest information for applying New Source Performance Standards to the nonmetallic mineral processing industry, present field tested techniques for determining compliance of affected facilities, and answer some of the questions frequently asked concerning the nonmetallic mineral processing NSPS.

Keywords: *New Source Performance Standards, *Air pollution abatement, *Air pollution control, *Mineral industry, Nonmetals, Inspection, Air pollution standards, Stationary sources, Performance standards, Bags, Screens, Crushing, Grinding, Standards compliance, Industrial wastes, Particles, Pollution regulations, Field tests, Records management.

PB91-216176/REB PC **A11**/MF **A03**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Procedures for the Preparation of Emission Inventories for Carbon Monoxide and Precursors of Ozone. Volume 2. Emission Inventory Requirements for Photochemical Air Quality Simulation Models.
Systems Applications, Inc., San Rafael, CA.
L. Gardner, L. R. Chinkin, and J. G. Heiken. May 91, 240p EPA/450/4-91/014
Contract EPA-68-DO-0124
See also PB89-152409 and PB80-202229. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

This is a companion document to Volume I, which describes procedures for compiling the annual countywide inventory of volatile organic compound (VOC) emissions. Volume II describes procedures for converting the annual countywide emission inventory to the detailed inventory needed for photochemical models. The detailed inventory contains hourly gridded emissions (by species class for VOC and NOx) and CO for the days to be simulated in the photochemical model. The document is an update to the original, (450/4-79-018), published is 1979.

Keywords: *Carbon monoxide, *Air pollution, *Air quality, *Photochemical reactions, *Mathematical models, Pollution sources, Ozone, Procedures, Volatile organic compounds, Nitrogen oxides, Spatial distribution, Design criteria, Data processing, Combustion products, Temporal distribution, Concentration(Composition), Natural emissions, Revisions, Fugitive emissions, Exhaust emissions, *Emission inventories, Urban Airshed Model.

PB91-216184/REB PC **A03**/MF **A01**
Protocol for the Field Validation of Emission Concentrations from Stationary Sources.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Apr 91, 42p EPA/450/4-90/015
See also PB91-182907.

The purpose of the validation protocol is to determine bias and precision of the test method at the level of concentration in the gas stream. Procedures involve (1) introducing known concentrations of an analyte or comparing the method against a validated test method to determine bias and (2) using multiple sampling trains to determine precision. The protocol lists a number of important requirements for the validation of the test method. They include; use of EPA audit material; documenting and reporting results; procedures for determining bias and precision by means of isotopic and analyte spiking of multiple train samples or comparison to validated methods; and, procedures for calculating precision, bias and correction factors. The protocol also defines the acceptance criteria in terms of percent bias and precision and how the determined precision dictates future testing with the validated method.

Keywords: *Air pollution detection, *Statistical analysis, *Validation, *Field tests, Emission factors, Air pollution monitoring, Stationary sources, Precision.

PB91-216192/REB PC **A03**/MF **A01**
FATE: The Environmental Fate Constants Information System Database.
Environmental Research Lab., Athens, GA.
H. P. Kollig, K. J. Hamrick, and B. E. Kitchens. Jul 91, 29p EPA/600/3-91/045
See also PB90-245606. Prepared in cooperation with Computer Sciences Corp., Athens, GA.

A new online database, designated the FATE database, has been developed for the interactive retrieval of kinetic and equilibrium constants that are needed for assessing the fate of chemicals in the environment. The database contains values for twelve parameters, but may not contain a value for each parameter for each chemical. As of June 1991, the database contained values for about 200 chemicals. Unique features of the database include experimental data that are extracted only from primary references and pertinent experimental conditions that are entered into the database to assure the user of the credibility and applicability of a value. A newly developed computer program is used to extrapolate hydrolysis rate constants to a standard format. Acidic, basic and neutral contributions are combined to calculate the overall hydrolysis rate constant and the half-life of the chemical at 25 C and pH 7. The data also are reported as second-order acidic and basic rates and a first-order neutral rate at 25 C. Products of transformation are listed for degradation processes when available. A newly developed computerized expert system will be applied to compute accurate fate constant values. The expert system has the capability of crossing chemical boundaries to cover all organic compounds.

Keywords: *Chemical equilibrium, *Environment transport, *Reaction kinetics, *Information systems, Data base management, Expert systems, Chemical compounds, Experimental data, Hydrolysis, Data processing, Pollution sources, Constants, pH, Risk assessment, Path of pollutants, Information retrieval effectiveness, *FATE data base.

PB91-216200/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Choices in Monitoring Wetlands. Symposium paper.
ManTech Environmental Technology, Inc., Corvallis, OR.
P. Adamus. 1991, 26p EPA/600/D-91/129
Presented at the USEPA International Symposium 'Ecological Indicators' held in 1991. Sponsored by Corvallis Environmental Research Lab., OR.

Wetlands pose unusual challenges for monitoring programs. The enormous spatial and temporal variability that is typical of wetlands requires that large numbers of samples be collected if the wetland community is to be properly characterized. However, access problems severely limit the ability to easily sample wetlands. Nonetheless, the need for more vigorous wetland sampling efforts is compelling. Many undisturbed wetlands are characterized by exceptional biological productivity, but at the same time, can easily accumulate contaminants from a wide area. This is partly because most wetlands are located in a topographically low, depositional environment and have long hydraulic detention times. The combination of normally great productivity and large potential for exposure to unnatural stresses suggests a need for extensive monitoring, so remedial action may be taken if wetlands begin to show signs of functional impairment. However, wetlands seldom are monitored in a geographically extensive, comparative manner. This chapter begins with discussions of considerations for wetland monitoring programs, and later discusses differences that may occur among wetland types and regions, using as an example an analysis of existing bird databases.

Keywords: *Biological indicators, *Environmental monitoring, *Wetlands, *Ecosystems, *Water pollution sampling, Data processing, Case studies, Birds, Species diversity, Biological stresses, Wildlife, Ranking, Remedial action, Hydrology, Vegetation, Mathematical models, Experimental design, Biological effects.

PB91-216218/REB PC **A03**/MF **A01**
Aseptic Sampling of Unconsolidated Heaving Soils in Saturated Zones. Book chapter.
Robert S. Kerr Environmental Research Lab., Ada, OK.
L. E. Leach, and R. R. Ross. 1991, 17p EPA/600/D-91/130

Collecting undisturbed subsurface soil samples in noncohesive, heaving sandy environments below the water table has been extremely difficult using conventional soil sampling equipment. Several modifications of the conventional hollow-stem auger coring procedures were adapted, which allowed collection of depth-discreet soil samples in very fluid, heaving sands. These methods were used where accurate subsurface characterization of the contamination of RCRA and CERCLA sites was essential. Cohesionless cores were consistently retrieved, aseptically extruded from the core barrel inside an anaerobic environmental chamber, and preserved in the field. The physical, chemical, and biological integrity of discreet soil intervals was maintained for laboratory analysis. Statistical analysis of repeated collection of soil samples from the same depth intervals in nearby boreholes was documented.

Keywords: *Subsurface investigations, *Soil analysis, *Land pollution, *Waste disposal, *Soil contamination, Water pollution, Water table, Superfund, Statistical analysis, Sampling, Sediments, Environmental transport, Drill core analysis, Hazardous materials, Flow augmentation, Ground water, Aquifers, Boreholes, Reprints.

PB91-216226/REB PC **A03**/MF **A01**
Photochemical Fate of Agrochemicals in Natural Waters. Journal article.
Environmental Research Lab., Athens, GA.
R. G. Zepp. 1991, 21p EPA/600/D-91/131
Pub. in Pesticide Chemistry: Advances in International Research, Development, and Legislation, p329-345 1991.

Agrochemicals are introduced into aquatic environments through direct application or through indirect pathways such as runoff, partitioning into condensed phases in the troposhere, and atmospheric deposition into freshwater and marine systems. Sunlight-induced direct and indirect photoreactions are an important sink for agrochemicals in such environments. Both laboratory and field studies have been conducted to develop and test concepts and mathematical relationships that describe environmental photoreactions. These efforts achieved early success in the case of photoreactions that involve the direct absorption of solar radiation by agrochemicals. Direct photoreactions, however, account for only a part of these sunlight-induced reactions. Recent studies have shown that other reactions involving photochemically produced reactive chemical transients also are an important fate for many agrochemicals. These include hydroxyl, hydroperoxyl/superoxide, organoperoxyl, carbonate, and dibromide ion radicals as well as singlet molecular oxygen and solvated electrons. Hydrogen peroxide, a widely distributed oxidant in the sea, fresh waters, and cloud water that is produced via the intermediacy of superoxide radicals, may be involved in the oxidation of agrochemicals by the Fenton reaction or by peroxidase-catalyzed oxidations.

Keywords: *Agricultural chemicals, *Water pollution effects, *Photochemical reactions, *Water chemistry, Precipitation(Meteorology), Path of pollutants, Oxidation, Pesticides, Research and development, Experimental design, Sea water, Adsorption, Air water interactions, Deposition, Field tests, Fresh water, Reaction kinetics, Solar radiation, Agricultural runoff, Reprints, Chemical reaction mechanisms.

PB91-216234/REB PC **A03**/MF **A01**
Study Design to Investigate and Simulate Agrochemical Movement and Fate in Groundwater Recharge (Chapter 8). Book chapter.
Environmental Protection Agency, Athens, GA.
L. E. Asmussen, and C. N. Smith. 1991, 17p EPA/600/D-91/132
Pub. in Groundwater Residue Sampling Design (American Chemical Society Symposium series 465) p150-164 1991. Prepared in cooperation with Agricultural Research Service, Tifton, GA. Southeast Watershed Research Lab.

The vulnerability of aquifers to contamination by agrochemicals is relatively high in the southeastern Coastal Plain. Transport and transformation of agrochemicals in either the root, unsaturated, or saturated zones can be simulated by existing mathematical models. However, a linked mathematical model is needed to simulate the movement and degradation from the point of application through the unsaturated zone, and into groundwater. The United States Geological Survey and Agricultural Research Service initiated a cooperative investigation in 1986. In 1988, the United States Environmental Protection Agency joined the research investigation. The agencies are sharing technical expertise and resources to develop an understanding of physical, chemical, and biological processes and to evaluate their spatial and temporal variability; and to develop and validate linked model(s) that would describe chemical fate. Study sites have been selected in the Fall Line Hills district of the Coastal Plain province. The Claiborne aquifer recharge area is located in the district near Plains, Georgia. Instrumentation to measure water and chemical transport has been installed.

Keywords: *Agricultural chemicals, *Water pollution sampling, *Path of pollutants, *Groundwater recharge, Pesticides, Environmental transport, Aquifers, Mathematical models, Field tests, Spatial distribution, Temporal distribution, Research and development, Data processing, Site surveys, Reprints, Southeast Coastal Plain Region(United States), Cooperative agreements.

PB91-216242/REB PC **A03**/MF **A01**
Total Human Exposure: Basic Concepts, EPA Field Studies, and Future Research Needs. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Office of Research and Development.
W. R. Ott. cJul 90, 12p EPA/600/J-90/531
Pub. in Jnl. of Air and Waste Management Association, v40 n7 Jul 90.

Historically, environmental regulatory programs designed to protect public health have monitored pollutants only in geophysical carrier media (for example, outdoor air, streams, soil). Field studies have identified a gap between the levels observed in geophysical carrier media and concentrations with which people actually come into contact: their daily exposures. A new approach--Total Human Exposure (THE) has evolved to fill the gap and provide the critical data needed fpr accurately assessing public health risk. The THE approach considers a three-dimensional 'bubble' around each person and measures the concentrations of all pollutants contacting that bubble, either through the air, food, water, or skin. Two basic THE approaches have emerged: (1) the direct approach using probability samples of populations and measuring pollutant concentrations in the food eaten, air breathed, water drunk, and skin contacted; and (2) the indirect approach using human activity pattern-exposure models to predict population exposure distributions.

Keywords: *Public health, *Risk assessment, *Health risk, *Environmental surveys, Concentration(Composition), Exposure, Population distributions, Field tests, Skin(Anatomy), Food chains, Three-dimensional calculations, Environmental research, Mathematical models, Air pollution effects(Humans), Water pollution effects(Humans), Ecology, Reprints, *Total Human Exposure.

PB91-216259/REB PC **A02**/MF **A01**
Environmental Research Lab.-Duluth, MN.
Chemical Suitability of Substrates for Walleye Egg Development in the Lower Fox River, Wisconsin. Journal article.
Michigan Technological Univ., Houghton.
M. T. Auer, and N. A. Auer. c1990, 8p EPA/600/J-90/532
Pub. in Transactions of the American Fisheries Society 119, p871-876 Nov 90. Sponsored by Environmental Research Lab.-Duluth, MN.

Site suitability for egg development was assessed for walleyes Stizostedion vitreum in the Fox River, Wisconsin. Water chemistry at the sediment-water interface was compared with criteria for walleye egg hatch success (oxygen and hydrogen sulfide) and chronic toxicity (free ammonia). Reduced concentrations of dissolved oxygen and elevated concentrations of ammonia-nitrogen and hydrogen sulfide occurred above some sand and all soft muck substrates. The chemical oxygen demand (COD) of the surficial sediments was a useful surrogate variable for identifying the chemical suitability of spawning sites; locations with a surficial sediment COD less than 40 mg O2/g dry weight were considered suitable. A comprehensive surficial sediment survey of the lower Fox River below the DePere Dam showed that optimal walleye spawning habitat (gravel-cobble substrate) is rare (less than 3% of the area) and that 75% of the suboptimal (sand and muck) substrate is chemically unsuitable for walleye egg development. The authors concluded that successful natural reproduction by walleye in the portion of the lower Fox River is limited by the availability of suitable substrate. (Copyright (c) 1990 the American Fisheries Society.)

Keywords: *Water quality, *Ovum, *Fishes, Water pollutant effects(Animals), Fox River, Wisconsin, Sediments, Biodeterioration, Oxygen, Reprints, *Walleyes, Stizostedion vitreum.

PB91-216267/REB PC **A02**/MF **A01**
Bilateral Wastewater Land Treatment Research by China and the USEPA. Journal article.
Robert S. Kerr Environmental Research Lab., Ada, OK.
L. E. Leach, Z. B. Duan, S. T. Wang, and B. E. Bledsoe. c1991, 10p EPA/600/J-91/077
Pub. in Water Science Technology, v24 n5 p33-40 1991. See also PB91-162636. Prepared in cooperation with Beijing Municipal Research Inst. of Environmental Protection (China).

The study was conducted to evaluate the rapid infiltration (R.I.) method of land treatment as a partial solution to wastewater treatment and reuse for the 0.45 billion cu m/yr (15.75 billion cu ft/yr) of safe irrigation water needed by the year 2000. Chinese environmental scientists and water supply managers are considering the use of the technology for diluting high concentrations of nitrate in the ground water while simultaneously recharging severely overdrafted aquifers. The wastewater used in the study contained synthetic organic compounds found on EPA's list of priority pollutants. During the development of EPA's Land Treatment Design Manuals, research was terminated before a thorough evaluation of the treatability of these compounds could be completed. Therefore, during the study, an evaluation of R.I. systems ability to treat selected priority pollutants as well as fecal coliform bacteria was carried out in the interest of RSKERL's research objectives. Even though the research was focused on operations to optimize the removal of various nitrogen species from primary effluent, the normal wastewater parameters of BOD, COD, SS, Total - P, and TOC were also studied. The volatile organic compounds most prominent in the wastewater, dichloroethene, dichloroethane, chloroform and carbon tetrachloride were also evaluated for treatability in the cooperative study.

Keywords: *Ground water recharge, *Organic compounds, *Sewage treatment, Fluid infiltration, Waste water reuse, Evaluation, Dilution, Nitrogen, Aquifers, Coliform bacteria, Feces, Concentration(Composition), Chloroform, Carbon tetrachloride, Reprints, Land treatment, Volatile organic compounds, Dichloroethene, Dichloroethane.

PB91-216275/REB PC **A03**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Large-Scale Natural Gradient Tracer Test in Sand and Gravel, Cape Cod, Massachusetts. 1. Experimental Design and Observed Tracer Movement. Journal article.
Geological Survey, Reston, VA.
D. R. LeBlanc, S. P. Garabedian, K. M. Hess, L. W. Felhar, and R. D. Quadri. c1991, 18p EPA/600/J-91/135
Grants NSF-ECE83-11786, NSF-CES88-14615
Pub. in Water Resources Research, v27 n5 p895-910 May 91. Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK., and National Science Foundation, Washington, DC.

A large-scale natural gradient tracer experiment was conducted on Cape Cod, Massachusetts, to examine the transport and dispersion of solutes in a sand and gravel aquifer. The nonreactive tracer; bromide, and the reactive tracers, lithium and molybdate, were injected as a pulse in July 1985 and monitored in three dimensions as they moved as far as 280 m down-gradient through an array of multilevel samplers. The bromide cloud moved horizontally at a rate of 0.42 m per day. It also moved downward about 4 m because of density-induced sinking early in the test and accretion of areal recharge from precipitation. After 200 m of transport, the bromide cloud had spread more than 80 m in the direction of flow, but was only 14 m wide and 4-6 m thick. The lithium and molybdate clouds followed the same path as the bromide cloud, but their rates of movement were retarded about 50% relative to bromide movement because of sorption onto the sediments. (Copyright (c) 1991 by the American Geophysical Union.)

Keywords: *Tracer studies, *Environmental transport, *Subsurface investigations, *Water pollution, *Path of pollutants, Aquifers, Ground water, Chemical properties, Field tests, Physical properties, Lithium, Bromides, Horizontal orientation, Vertical migration, Injection wells, Stochastic processes, Geochemistry, Hydrogeology, Hydrology, Water quality, Molybdates, Reprints, Cape Cod(Massachusetts).

PB91-216283/REB PC **A02**/MF **A01**
Influence of Organic Cosolvents on the Sorption Kinetics of Hydrophobic Organic Chemicals. Journal article.
Robert S. Kerr Environmental Research Lab., Ada, OK.
M. L. Brusseau, A. L. Wood, and P. S. C. Rao. c1991, 10p EPA/600/J-91/136
Pub. in Environmental Science and Technology, v25 n5 p903-910 1991. See also PB86-164886. Prepared in cooperation with Florida Univ., Gainesville. Dept. of Soil Science, and Arizona Univ., Tucson. Dept. of Soil and Water Science.

A quantitative examination of the kinetics of sorption of hydrophobic organic chemicals by soils from mixed solvents reveals that the reverse sorption rate constant k(sub 2) increases log-linearly with increasing volume fraction of organic cosolvent f(sub c). The relationship was expected, based on the existence of a log-log inverse relationship between k(sub 2) and the equilibrium sorption constant K(sub p), and a log-linear inverse relationship between K(sub p) and f(sub c). These results are interpreted in terms of a conceptual model wherein sorption kinetics is controlled by diffusion of sorbate within the matrix of sorbent organic matter. Decreased polarity of the mixed solvent, caused by the addition of a cosolvent, appears to influence the conformation of the polymeric organic matter and, hence, the rate of sorbate diffusion. (Copyright (c) 1991 by the American Chemical Society.)

Keywords: *Soil science, *Sorption, *Organic solvents, *Mathematical models, *Environmental research, Kinetics, Organic matter, Environmental transport, Herbicides, Land pollution, Diffusion, Reprints.

PB91-216291/REB PC **A03**/MF **A01**
Techniques Affecting Precision and Accuracy in Hydrolysis Rate Constant Determinations of Volatile Organic Compounds Using Jeffers' Zero Headspace Reaction Bulbs. Journal article.
Environmental Research Lab., Athens, GA.
C. D. Trusty, and J. J. Ellington. c1991, 22p EPA/600/J-91/137

Pub. in Analytical Letters 24, n2 p327-344 Feb 91. Prepared in cooperation with Technology Applications, Inc., Athens, GA.

A recently published method for measurement of hydrolysis rate constants for volatile organic compounds in aqueous samples was adopted for use in the laboratory. In applying the method, the authors developed the capability to make the zero-headspace reaction bulbs and used them to measure the hydrolysis rate constant for 1,1,1-trichloroethane. After establishing and mastering the critical points of the technique, they were able to determine an acceptable neutral hydrolysis rate constant (kn=7.98 E-2, 115 C) that was within 17% of the value calculated using the Arrhenius parameters of Jeffers' method. A detailed description of their experiences while learning this technique and becoming proficient in its use is provided in the belief that the experience would benefit other analytical chemists. (Copyright (c) Marcel Dekker, Inc., 1991.)

Keywords: *Chloroethanes, *Hydrolysis, *Reaction kinetics, *Volatile organic compounds, *Gas chromatography, Arrhenius equation, Evaluation, Reprints, *Zero headspace bulbs.

PB91-216309/REB PC **A02/MF A01**
Environmental Research Lab., Athens, GA.
CORMIX: An Expert System for Mixing Zone Analysis. Journal article.
Cornell Univ., Ithaca, NY. DeFrees Hydraulics Lab.
G. H. Jirka, R. L. Doneker, and T. O. Barnwell. c1991, 10p EPA/600/J-91/138
Pub. in Water Science and Technology, v24 n6 p267-274 Jun 91. See also PB88-220504. Prepared in cooperation with Portland Univ., OR. Multnomah School of Engineering. Sponsored by Environmental Research Lab., Athens, GA.

United States water quality policy includes the concept of a mixing zone, a limited area where initial dilution of a discharge occurs. Current practice in mixing zone analysis is plagued by a number of problems--mixing zone definitions vary widely, there is a diversity of discharge and site conditions, existing models focus on near-field mixing while legal definitions extend to greater distances, and there are a large number of permitting applications needing review. The Cornell Mixing Zone Expert System (CORMIX) is a series of software elements for analysis and design of submerged buoyant or nonbuoyant discharges containing conventional or toxic pollutants into stratified or unstratified waters, with emphasis on the geometry and dilution characteristics of the initial mixing zone. Subsystem CORMIX1 deals with single port discharges, CORMIX2 addresses multiport diffusers, and subsystem CORMIX3 analyzes surface discharges. The software is implemented on microcomputers using the MS-DOS operating system. It contains two key elements-- (1) a rigorous flow classification scheme that analyzes the near-field behavior of a discharge and (2) a collection of predictive elements for each discharge scenario. The paper describes the development philosophy underlying CORMIX, the capabilities of the three subsystems, and the procedure for obtaining the software. (Copyright (c) 1991 IAWPRC.)

Keywords: *Water pollution control, *Point sources, *Water quality management, *Mathematical models, *Expert systems, Path of pollutants, Toxic substances, Reprints, *CORMIX1 program, *Mixing zone analysis.

PB91-216317/REB PC **A13/MF A03**
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
Handbook: Permit Writer's Guide to Test Burn Data, Hazardous Waste Incineration.
IT Environmental Programs, Inc., Cincinnati, OH.
Sep 86, 295p EPA/625/6-86/012
See also PB84-100577. Prepared in cooperation with JACA Corp., Fort Washington, PA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.

The book contains test data collected at 23 stationary incinerators, conducted both by EPA and private industrial clients. These tests were conducted in accordance with requirements established under the Resource Conservation and Recovery Act (RCRA). In addition to incinerator data, results from 11 lime, cement, and aggregate kilns plus 11 industrial boilers are included. Most of these tests were conducted by EPA. This compilation of data was the first time that such a compilation of data from so many combustion sources was ever accomplished. These data were to be used in conjunction with other EPA guidance available (e.g., EPA Guidance Manual for Hazardous Waste Incinerator Permits, PB84-100577. Professional judgment must be exercised by the user to avoid giving too much credence to questionable data, which have been flagged insofar as possible. The reader must be aware that all data in the handbook are for tests prior to 1986.

Keywords: *Incineration, *Waste disposal, *Permits, *Hazardous materials, *Air pollution monitoring, *Handbooks, Performance evaluation, Combustion efficiency, Standards compliance, Particles, Thermal utilization, Incinerators, Kilns, Operation, Tables(Data), Air pollution standards, Concentration(Composition), Boilers, Principal organic hazardous constituents.

PB91-216325/REB PC **A16/MF A03**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Analysis of Historical Radiatively Important Trace Gases (RITG) Emissions: Development of a Trace Gas Accounting System (T-GAS) for 14 Countries. Final rept.
Alliance Technologies Corp., Chapel Hill, NC.
S. Piccot, T. Lynch, R. Kaufmann, C. Cleveland, and B. Moore. Jun 91, 372p CH-90-75, EPA/600/9-91/019
Contract EPA-68-D9-0173
Prepared in cooperation with Boston Univ., MA., and New Hampshire Univ., Durham. Inst. for the Study of Earth, Oceans and Space. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report gives results of a Phase 2 study to (1) develop and test a carbon dioxide (CO2) emissions model for 14 countries; (2) conduct a limited test of the model's forecasting capability by estimating and comparing emissions forecasts for Poland with those developed by other models; and (3) use the model and accompanying global energy use databases to summarize and assess historical energy use and emissions patterns for the 14 countries. (NOTE: The Phase 1 study, completed in September 1989, focused on evaluating the feasibility of developing a country-specific CO2 emissions forecast model. One objective of the Phase 1 study was to develop a pilot-scale emissions model that could be used to estimate energy consumption and CO2 emissions for specific energy end-use sectors in a country. Consistent with the objective, a pilot-scale model was developed for Poland, South Korea, France, and India. Another objective of the Phase 1 study was to test or validate the methodology used in the model and, if the methodology was viable, to develop a full-scale model development plan. Analysis of the results from the pilot model showed that the methodology was potentially viable for developing a country-specific global emissions model.) A key outcome of the Phase 2 study was the development of model algorithms and databases for the 14 countries.

Keywords: *Carbon dioxide, *Global air pollution, *Forecasting, *Mathematical models, *Emission factors, Greenhouse effect, Thermal radiation, Energy consumption, Air pollution control, Stationary sources, Poland, *Trace gas accounting system.

PB91-216333/REB PC **A04/MF A01**
Health and Environmental Effects Document for 4-Aminopyridine.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Jan 89, 73p EPA/600/8-89/050

The Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment has investigated the health and environmental effects for 4-aminopyridine. Several quantitative toxicological estimates are presented that reflect evaluations of the substance's potential effects to human health, aquatic life, and the environment. Environmental fate and transport data are provided for air, soil, and water. Additionally, exposure levels are reported for the substance's presence in water, air, food, and potential dermal contact. Results of pharmacokinetic evaluations and carcinogenicity risk assessments are also provided.

Keywords: *Environmental pollutants, *Toxicity, *Health hazards, Carcinogenicity tests, Laboratory animals, Metabolism, Pharmacokinetics, Air pollutants, Water pollutants, Soil contamination, Chemical reactions, Mutagenicity tests, Teratogens, Reproduction(Biology), Biodeterioration, Aquatic biology, Environmental exposure pathways, *Aminopyridine, CAS 504-24-5.

PB91-216341/REB PC **A05/MF A01**
Health and Environmental Effects Document for 1,3-Butadiene.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Jan 89, 86p EPA/600/8-89/051

The Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment has investigated the health and environmental effects for 1,3 butadiene. Several quantitative toxicological estimates are presented that reflect evaluations of the substance's potential effects to human health, aquatic life, and the environment. Environmental fate and transport data are provided for air, soil, and water. Additionally, exposure levels are reported for the substance's presence in water, air, food, and potential dermal contact. Results of pharmacokinetic evaluations and carcinogenicity risk assessments are also provided.

Keywords: *Butadiene, *Toxicity, *Health hazards, Carcinogenicity tests, Mutagenicity tests, Laboratory animals, Metabolism, Pharmacokinetics, Air pollutants, Water pollutants, Soil contamination, Terrestrial ecosystems, Teratogens, Reproduction(Biology), Biodeterioration, Aquatic biology, Environmental exposure pathways, *Environmental pollutants, CAS 106-99-0.

PB91-216358/REB PC **A04/MF A01**
Health and Environmental Effects Document for Acetophenone.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
May 87, 65p EPA/600/8-89/104

The Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment has investigated the health and environmental effects for acetophenone. Several quantitative toxicological estimates are presented that reflect evaluations of the substance's potential effects to human health, aquatic life, and the environment. Environmental fate and transport data are provided for air, soil, and water. Additionally, exposure levels are reported for the substance's presence in water, air, food, and potential dermal contact. Results of pharmacokinetic evaluations and carcinogenicity risk assessments are also provided.

Keywords: *Acetophenone, *Environmental pollutants, *Toxicity, *Health hazards, Carcinogenicity tests, Laboratory animals, Metabolism, Pharmacokinetics, Air pollutants, Water pollutants, Soil contamination, Chemical reactions, Mutagenicity tests, Reproduction(Biology), Biodeterioration, Aquatic biology, Environmental exposure pathways, Teratogens, CAS 98-86-2.

PB91-216366/REB PC **A05/MF A01**
Corvallis Environmental Research Lab., OR.
Field Calibration of Soil Core Microcosms for Evaluating Fate and Effects of Genetically Engineered Microorganisms in Terrestrial Ecosystems.
Battelle Pacific Northwest Labs., Richland, WA.
H. Bolton, J. K. Fredrickson, S. A. Bentjen, D. J. Workman, and S. W. Li. Apr 91, 88p EPA/600/3-91/041
Contract DE-AC06-76RLO-1830
Sponsored by Corvallis Environmental Research Lab., OR., and Department of Energy, Washington, DC.

Pacific Northwest Laboratory compared intact soil-core microcosms and the field for ecosystem structural and functional properties after the introduction of a model genetically engineered microorganism (GEM). The project used two distinct microbial types as model GEMs, Gram-negative Pseudomonas sp RC1, which was an aggressive root colonizer, and Gram-positive Streptomyces lividans TK24. The model GEMs were added to surface soil in separate studies throughout a ten month period. Also, RC1 was used in studies conducted during two consecutive field seasons to determine how year-to-year field variability influenced the calibration of microcosms with the field. The main conclusions of the research were that intact soil-core microcosms can be useful to simulate the field for studies

of microbial fate and effects on ecosystem structural and functional properties.

Keywords: *Terrestrial ecosystems, *Soil microbiology, *Genetic engineering, Pseudomonas, Seasonal variations, Field tests, Temperature, Soil water, Microbial colony count, Risk assessment, *Soil-core microcosms, Streptomyces lividans.

PB91-216374/REB PC **A06**/MF **A02**
Corvallis Environmental Research Lab., OR.
Novel Methods for Tracking 'Agrobacterium Radiobacter' k84 and Plasmid-Borne Genes in Agricultural Ecosystems.
Oregon State Univ., Corvallis. Dept. of Botany and Plant Pathology.
L. W. Moore, J. Loper, V. Stockwell, and M. Kawalek.
Jul 91, 118p EPA/600/3-91/042
Prepared in cooperation with Agricultural Research Service, Corvallis, OR. Horticultural Crops Research Lab. Sponsored by Corvallis Environmental Research Lab., OR.

Ecological studies of microbes introduced into the environment have been limited by the lack of sensitive and specific methods for detection and identification of released organisms among the myriad of other microbes present in nature. Similar difficulties exist for detection of DNA transfer from a released organism to other microbes in the environment. Techniques generating viable counts of specific microbes from environmental samples are among the best available for ecological studies of microorganisms released into the environment. Antiserum that is specific to certain species or strains of bacteria from environmental samples by immunoisolation techniques. Immunoisolation can detect a few cells of certain bacterial pathogens in a milliliter of seed extract. The application of immunoisolation and viable count methods to detection of released microbes in soil or on plant roots was an objective of the study.

Keywords: *Soil microbiology, *Plasmids, *Bacterial genes, *Terrestrial ecosystems, Field tests, Genetic engineering, DNA probes, Mutations, Microbial drug resistance, Virulence, Streptomycin, Rifampicin, Southern blotting, Bioassay, Genetic conjugation, *Agrobacterium radiobacter, Opines.

PB91-216382/REB PC **A04**/MF **A01**
Corvallis Environmental Research Lab., OR.
Episodic Acidification and Associated Fish and Aquatic Invertebrate Responses in Four Catskill Mountain Streams: An Interim Report of the Episodic Response Project. Open file rept.
Geological Survey, Reston, VA.
P. S. Murdoch, C. E. Bonitz, K. W. Eakin, A. J. Ranalli, and E. C. Witt. Jul 91, 60p USGS/OFR-90/566, EPA/600/3-91/040
See also PB91-176065. Prepared in cooperation with EA Engineering, Science, and Technology, Inc., Middletown, NY. Sponsored by Corvallis Environmental Research Lab., OR.

The Episodic Response Project is a multidisciplinary research project designed to assess the role of storm and snowmelt runoff in stream acidification and the associated responses of fish and invertebrates. Four streams in the Catskill region of eastern New York were selected to represent the following conditions: (1) high acid-neutralizing capacity (ANC) with no acidic episodes annually, (2) high ANC with few acidic episodes, (3) moderate to low ANC with few acidic episodes, and (4) low ANC with frequent acidic episodes. Results of the first 9 months of research in the Catskill region indicate that storm and snowmelt runoff are associated with short periods of stream acidification that, if sufficiently severe, lead to fish mortality or migration away from acidic reaches. Increased discharge coincided with decreased pH and increased total aluminum concentrations in all four streams.

Keywords: *Acidification, *Streams, *Invertebrates, *Fishes, *Water pollution effects(Animals), Snowmelt, Catskill Mountains, Mortality, Water chemistry, Monitoring, Precipitation(Meteorology), Watersheds, pH, Aluminum, Concentration(Composition), *Storm water runoff.

PB91-216390/REB PC **A05**/MF **A02**
Corvallis Environmental Research Lab., OR.
Sequestering Carbon in Soils: A Workshop to Explore the Potential for Mitigating Global Climate Change. Held in Corvallis, Oregon on February 26-28, 1990.
ManTech Environmental Technology International, Inc., Corvallis, OR.
M. G. Johnson, J. S. Kern, D. A. Lammers, J. J. Lee, and L. H. Liegel. 15 Apr 91, 100p EPA/600/3-91/031
Contract EPA-68-C8-0006
Sponsored by Corvallis Environmental Research Lab., OR.

The workshop was an excellent forum for a scientific debate on the potential of soils to sequester additional carbon from the atmosphere. Two primary conclusions can be drawn from the workshop. First, that steps should be taken to protect and preserve the size and integrity of the global reservoir of soil carbon because continued losses of soil carbon to the atmosphere could exacerbate global warming and climatic change. Second, that steps should be taken to manage soils and ecosystems to store additional carbon. The latter being accomplished predominately by increasing net primary production. The major uncertainties related to carbon sequestration in soils and specific strategies for addressing these uncertainties and for managing soils to store carbon were also identified at the workshop.

Keywords: *Meetings, *Carbon cycle, *Terrestrial ecosystems, *Air land interactions, *Air pollution, *Soil management, Global warming, Climatic changes, Global aspects, Methane, Soil science, Land use, Atmospheric composition, Greenhouse effect, Vegetation, Carbon dioxide.

PB91-216408/REB PC **A18**/MF **A04**
Environmental Protection Agency, Washington, DC. Economics and Technology Div.
Evaluation of the Asbestos Hazard Emergency Response Act (AHERA). Final rept.
Westat, Inc., Rockville, MD. Research Div.
A. Fraser, R. Clickner, N. Everett, and S. Viet. Jun 91, 416p EPA/560/4-91/013
Sponsored by Environmental Protection Agency, Washington, DC. Economics and Technology Div.

The AHERA regulations called for the inspection of all elementary and secondary schools in the nation to identify any asbestos containing building materials (ACBM) present, and the conduct of specified other tasks related to asbestos in schools. The AHERA evaluation consisted of six separate research areas to address each of the primary components of AHERA. These were: school building inspections, management plans, response actions, original AHERA inspector evaluation, notification, and maintenance and custodial worker training. The final report presents a detailed description of the methodology of the evaluation, statistical techniques used, and all of the research findings in the six research areas.

Keywords: *Pollution regulations, *School buildings, *Asbestos, *Construction materials, *Indoor air pollution, Building materials, Emergency plans, Inspections, Building codes, Management planning, Statistical analysis, Notification procedures, Custodian training, Compliance, Evaluation, *Asbestos Hazard Emergency Response Act.

PB91-216416/REB PC **A04**/MF **A01**
Corvallis Environmental Research Lab., OR.
UTAB Users Manual. Microcomputer Version. First Edition, 1991.
Oklahoma Univ., Norman. Dept. of Botany and Microbiology.
J. E. Nellessen, and J. S. Fletcher. Jul 91, 60p EPA/600/8-91/047
Sponsored by Corvallis Environmental Research Lab., OR.

The UTAB database is a computerized information resource that permits the rapid retrieval and comparison of data pertaining to the uptake, accumulation, translocation, adhesion, and biotransformation of both organic chemicals and heavy metals by vascular plants. UTAB can be used to estimate the accumulation of applied chemicals and their biotransformed products in vegetation. Data pertaining to a specific chemical, species, or process (uptake, translocation, etc.) can be obtained from the database. UTAB serves as a rapid means of accessing numerical data without reading the published papers from which the database was derived. The manual provides instructions for use of the microcomputer database UTAB. The UTAB database is designed for use with 'dBASE IV', commercial software available from the Ashton-Tate Corporation, Torrance, CA. The manual describes the contents of UTAB, dBASE IV commands required for use of UTAB, and the search procedures in sufficient detail to allow users of the manual to conduct database searches without additional references.

Keywords: *User manuals(Computer programs), *Information systems, *Plants(Botany), *Terrestrial ecosystems, *Land pollution, Xenobiotics, Data base management, Organic chemicals, Heavy metals, Vegetation, Bioaccumulation, Environmental transport, Biological effects, Soil contamination effects, Food chains, *UTAB system.

PB91-216424/REB PC **A06**/MF **A02**
Health and Environmental Effects Document for Bromoform.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Sep 89, 119p EPA/600/8-90/025

The Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment has investigated the health and environmental effects for bromoform. Several quantitative toxicological estimates are presented that reflect evaluations of the substance's potential effects to human health, aquatic life, and the environment. Environmental fate and transport data are provided for air, soil, and water. Additionally, exposure levels are reported for the substance's presence in water, air, food, and potential dermal contact. Results of pharmacokinetic evaluations and carcinogenicity risk assessments are also provided.

Keywords: *Bromoform, *Environmental pollutants, *Toxicity, *Health hazards, Carcinogenicity tests, Laboratory animals, Metabolism, Pharmacokinetics, Air pollutants, Water pollutants, Soil contamination, Chemical reactions, Mutagenicity tests, Teratogens, Reproduction(Biology), Biodeterioration, Aquatic biology, Environmental exposure pathways, CAS 75-25-2.

PB91-216432/REB PC **A04**/MF **A01**
Corvallis Environmental Research Lab., OR.
Model YMT-6 UV-B Modulation System. Manual of Operation.
Maryland Univ., College Park.
J. H. Sullivan, Z. Yu, and A. H. Teramura. Jul 91, 74p EPA/600/8-91/048
Sponsored by Corvallis Environmental Research Lab., OR.

The YMT-6 Ultraviolet Irradiation Modulation System (YMT-6 UIMS) is designed to monitor solar UV-B radiation and deliver output of a bank of fluorescent sunlamps. The system uses a significant advance in technical approach which has not been previously used. The system employs a new detection/feedback system, using a true condition closed-loop feedback control system, which employs two detectors. The true-condition feedback system continuously monitors natural solar UV-B fluences and those fluences present at some point beneath a lamp bank (solar plus supplemental UV-B). The system then maintains a constant proportional supplement of UV-B beneath the lamp racks. Therefore, the YMT-UIMS will provide a realistic UV-B supplementation, which would be anticipated with a given ozone depletion, over a wide range of environmental conditions.

Keywords: *Solar ultraviolet radiation, *Radiation monitors, Near ultraviolet radiation, Ultraviolet detectors, Modulation, Maintenance, Operation, Irradiation, Instruction manuals, Design, Graphs(Charts), YMT-6 system, Ozone depletion.

PB91-216440/REB PC **A04**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Hospital Pollution Prevention Case Study.
Science Applications International Corp., McLean, VA.
R. Linett. Jul 91, 62p EPA/600/2-91/024
Contract EPA-68-C8-0062
Prepared in cooperation with Department of Veterans Affairs, Washington, DC. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency has instituted a broad pollution prevention research program through the Office of Research and Development to support continued environmental improvements throughout the nation. The Agency is also responding to the national concern in regards to the generation and disposal of medical wastes. In order to effectively implement its pollution prevention programs, the EPA is also investigating how the departments and agencies within the Federal community can help each other reduce their generation of wastes. As a part of these efforts, EPA's Risk Reduction Engineering Laboratory (RREL) provides staff and support to conduct waste minimization assessments under the Waste Reduction Evaluations and Assessments at Federal Sites (WREAFS) Program. Under the WREAFS program, the U.S. Department of Veterans Affairs Cincinnati - Fort Thomas Medical Center (DVA-Cin) offered to host an assessment of pollution prevention opportunities at their facility. The study investigated the use of disposables in patient care in order to identify research opportunities for future solid waste minimization.

Keywords: *Hospital solid wastes, *Pollution abatement, Environmental protection, US EPA, Waste recycling, Waste utilization, Disposable equipment, Medical supplies, *Waste minimization, *Medical wastes.

PB91-216457/REB PC **A09/MF A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Opportunity Assessment: Naval Undersea Warfare Engineering Station, Keyport, Washington. Final rept.
Science Applications International Corp., Bothell, WA.
Jul 91, 197p EPA/600/2-91/030
Contract EPA-68-C8-0061
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The report describes the application of EPA's waste minimization assessment procedures to a torpedo maintenance facility at the Naval Undersea Warfare Engineering Station, Keyport, WA. The assessment focused on the Mark 48 shop and the Mark 46 shop. These shops service the Mark 48 torpedo and the Mark 46 torpedo respectively. The five waste minimization options presented are volume reduction of contaminated clothing, automated cleaning of parts, automated fuel tank draining, modification of the deep sink draining schedule and recycling of mineral spirits.

Keywords: *Pollution abatement, *Hazardous materials, *Waste management, Assessments, Waste recycling, Water pollution control, Industrial waste treatment, Feasibility studies, Clothing, Military facilities, Fuel tanks, Drainage, Forms(Paper), Torpedoes, Navy, *Waste minimization, Source reduction.

PB91-216465/REB PC **A06/MF A02**
Health and Environmental Effects Document for 1-Butanol.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Sep 89, 119p EPA/600/8-90/031

The Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment has investigated the health and environmental effects for 1-butanol. Several quantitative toxicological estimates are presented that reflect evaluations of the substance's potential effects to human health, aquatic life, and the environment. Environmental fate and transport data are provided for air, soil, and water. Additionally, exposure levels are reported for the substance's presence in water, air, food, and potential dermal contact. Results of pharmacokinetic evaluations and carcinogenicity risk assessments are also provided.

Keywords: *Butanols, *Environmental pollutants, *Toxicity, *Health hazards, Carcinogenicity tests, Laboratory animals, Metabolism, Pharmacokinetics, Air pollutants, Water pollutants, Soil contamination, Chemical reactions, Mutagenicity tests, Teratogens, Reproduction(Biology), Biodeterioration, Aquatic biology, Environmental exposure pathways, CAS 71-36-3.

PB91-216473/REB PC **A06/MF A02**
Health and Environmental Effects Document for Cacodylic Acid.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Aug 89, 103p EPA/600/8-90/021

The Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment has investigated the health and environmental effects for cacodylic acid. Several quantitative toxicological estimates are presented that reflect evaluations of the substance's potential effects to human health, aquatic life, and the environment. Environmental fate and transport data are provided for air, soil, and water. Additionally, exposure levels are reported for the substance's presence in water, air, food, and potential dermal contact. Results of pharmacokinetic evaluations and carcinogenicity risk assessments are also provided.

Keywords: *Environmental pollutants, *Toxicity, *Health hazards, Carcinogenicity tests, Laboratory animals, Metabolism, Pharmacokinetics, Air pollutants, Water pollutants, Soil contamination, Chemical reactions, Mutagenicity tests, Teratogens, Reproduction(Biology), Biodeterioration, Aquatic biology, Environmental exposure pathways, *Cacodylic acids, CAS 75-60-5.

PB91-216481/REB PC **A05/MF A01**
Health and Environmental Effects Document for Chloral.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Mar 88, 79p EPA/600/8-89/012

The Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment has investigated the health and environmental effects for chloral. Several quantitative toxicological estimates are presented that reflect evaluations of the substance's potential effects to human health, aquatic life, and the environment. Environmental fate and transport data are provided for air, soil, and water. Additionally, exposure levels are reported for the substance's presence in water, air, food, and potential dermal contact. Results of pharmacokinetic evaluations and carcinogenicity risk assessments are also provided.

Keywords: *Chloral hydrate, *Environmental pollutants, *Toxicity, *Health hazards, Carcinogenicity tests, Laboratory animals, Metabolism, Pharmacokinetics, Air pollutants, Water pollutants, Soil contamination, Chemical reactions, Mutagenicity tests, Teratogens, Reproduction(Biology), Biodeterioration, Aquatic biology, Environmental exposure pathways, *Chloral, CAS 75-87-6, CAS 302-17-0.

PB91-216499/REB PC **A03/MF A01**
Toward a Better Understanding of the Complex Geochemical Processes Governing Subsurface Contaminant Transport.
Robert S. Kerr Environmental Research Lab., Ada, OK.
R. W. Puls. Jul 91, 17p EPA/600/M-91/013
Presented at the 'Transport and Mass Exchange Processes in Sand and Gravel Aquifers: Field and Modeling Studies' International Conference and Workshop, Ottawa, Canada, October 1-4, 1990.

Identification and understanding of the chemical, physical, and biological processes controlling subsurface contaminant migration is essential for making accurate predictions on the fate and transport of these constituents. Remediation assessment requires these predictions where pollution from municipal and industrial activities has occurred, and for the responsible siting of waste isolation and storage facilities. Geochemical processes include ion-exchange, precipitation, organic partitioning, chemisorption, aqueous complexation, and colloidal stability and transport. Current approaches to quantify the effect of these processes on transport in a ground water system primarily involve laboratory techniques. These include the use of closed static systems (batch experiments) and dynamic systems (column experiments) where a larger segment of the aquifer is investigated by analyzing the breakthrough profiles of reactive and non-reactive species. The latter approach may be more representative of in situ conditions than the former, however, when compared to large-scale field experiments both are still constrained by: differences in scale, alteration of media during sample collection and use, and spatial variability. More field reactivity studies are needed to complement established laboratory approaches for the determination of retardation factors, scaling factors for laboratory versus field data, corroboration or confirmation of batch and column results, and for validation of sampling techniques.

Keywords: *Environmental transport, *Geochemistry, *Path of pollutants, *Subsurface investigations, *Mathematical models, Physical properties, Chemical properties, Biological properties, Kinetics, Adsorption, Comparison, Field tests, Desorption, Ion exchanging, Waste disposal, Water pollution, Land pollution, Ground water, Path of pollutants.

PB91-216507/REB PC **A05/MF A01**
Corvallis Environmental Research Lab., OR.
Mammalian Wildlife (Mink and Ferret) Toxicity Test Protocols (LC50, Reproduction, and Secondary Toxicity).
Michigan State Univ., East Lansing. Dept. of Animal Science.
R. K. Ringer, T. C. Hornshaw, and R. J. Aulerich. Jul 91, 84p EPA/600/3-91/043
Sponsored by Corvallis Environmental Research Lab., OR.

Protocols describing guidelines for conducting dietary LC50 and reproduction toxicity tests and for assessing the primary versus secondary toxicity of a test substance using carnivorous mammalian wildlife, specifically mink (Mustela vison) or European ferrets (Mustela putorius furo) are presented. These protocols go beyond the procedural steps and include the rationale behind each recommendation. Appropriate statistical procedures for assessing the data are presented for each protocol.

Keywords: *Toxicity, *Carnivora, *Reproduction(Biology), Lethal dosage, Diet, Toxic substances, Dose-response relationships, Test methods, Statistical analysis, Mustela vison, Mustela putorius furo, Mink, Ferrets.

PB91-216515/REB PC **A11/MF A03**
Robert S. Kerr Environmental Research Lab., Ada, OK.
User's Guide for the Mathematical Model LT3VSI Denitrification in Nonhomogeneous Laboratory Scale Aquifers. Special rept.
Oregon State Univ., Corvallis. Agricultural Experiment Station.
G. A. Bachelor, D. E. Cawlfield, F. T. Lindstrom, and L. Boersma. Mar 91, 227p SR-869, EPA/600/2-91/034
Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

The report provides a user guide for a mathematical model describing transport and fate processes in laboratory scale model aquifers. Such model aquifers are constructed to evaluate strategies for the reclamation of groundwater contaminated with nitrates and other pollutants. The mathematical model can be used for evaluations of strategies for injecting chemicals, which could enhance pollutant degradation, into an aquifer. The model allows calculation of hydraulic pressure field and perturbations of the field by injection and/or extraction wells. It uses the pressure field to compute the Darcy velocities, which in turn are used in computing the chemical transport and fate. The model is LT3VSI, which handles four chemicals and two microbial populations.

Keywords: *Computerized simulation, *User manuals(Computer programs), *Denitrification, *Aquifers, *Water pollution control, Mathematical models, Injection wells, Environmental transport, Ground water, Nitrates, Experimental design, Darcys law, Water pressure, Extraction, Microorganisms, *LT3VSI model, LT3VSI computer program.

PB91-216523/REB PC **A08/MF A02**
Corvallis Environmental Research Lab., OR.
Current and Developing Analytical Technologies for Quantifying Biogenic Gas Emissions.
Battelle Pacific Northwest Labs., Richland, WA.
B. D. McVeety. Jun 91, 156p EPA/600/3-91/044
Contract DOE-DW89934110-0
Sponsored by Corvallis Environmental Research Lab., OR., and Department of Energy, Washington, DC.

The document presents an overview of techniques and technologies that will be important in defining the flux of biogenic gases from terrestrial and marine surfaces. A broad range of analytical methodologies applicable to the measurement of biogenic gas emissions are reviewed. These methodologies include those best suited to characterizing the key environmental, physicological, and physicochemical variables

that combine to determine biogenic gas fluxes from particular plants and/or soil systems, in addition to those techniques beter suited to providing validation of predictive models. Emerging technologies are also discussed that may be used in the near future to ascertain emission rates on landscape, regional, and global scales.

Keywords: *Natural emissions, *Gas analysis, *Marine environment, *Land resources, *Air pollution detection, *Air pollution monitoring, Atmospheric chemistry, Plants(Botany), Soil surveys, Technology utilization, Flux density, Trace amounts, Point sources, Physicology, Physicochemical properties, Remote sensing, Aerial surveys, Experimental design, Study estimates, Environmental surveys, Chemical analysis, Radiatively Important Trace Gases.

PB91-217364/REB PC **A08**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Sourcebook: NOx Control Technology Data. Final rept.
Radian Corp., Research Triangle Park, NC. Progress Center.
L. M. Campbell, D. K. Stone, and G. S. Shareef. Jul 91, 169p EPA/600/2-91/029
Contract EPA-68-02-4286
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report, a compilation of available information on the control of nitrogen oxide (NOx) emissions from stationary sources, is provided to assist new source permitting activities by regulatory agencies. The sources covered are combustion turbines, internal combustion engines, non-utility boilers and heaters, and waste incinerators. The report discusses the background of NOx formation in the combustion process and major NOx sources, and describes processes for NOx control. The current status of NOx control technology is discussed, and applications to meet permitting requirements are detailed. Permitted NOx emission levels are summarized by combustion source, fuel type, and control technology. Documentation includes references and contacts for further information.

Keywords: *Nitrogen oxides, *Pollution control, *Regulations, *Stationary sources, Government agencies, Licenses, Gas turbine engines, Internal combustion engines, Incinerators, Combustion products, Boilers, Heaters, Local government, State government.

PB91-217372/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Feasibility and Approach for Mapping Radon Potentials in Florida. Florida Radon Research Program. Final rept.
Rogers and Associates Engineering Corp., Salt Lake City, UT.
K. K. Nielson, and V. C. Rogers. Jul 91, 46p EPA/600/8-91/046
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab., and Florida Dept. of Community Affairs, Tallahassee.

The report gives results of an analysis of the feasibility and approach for developing statewide maps of radon potentials in Florida. The maps would provide a geographic basis for implementing new radon-protective building construction standards to reduce public health risks from exposure to radon. In this new mapping approach, variations in indoor radon are partitioned by source, house, and time variations. Source variations are partitioned from house variations by compiling radon entry rates for a reference house that is modeled as though located on varying layered soils that represent the source ariations throughout the state. House variations are represented from existing indoor radon data after normalizing to the source potential at each location. Time variations are minimized by using invariant or long-term parameters. Two kinds of maps would result from this approach's radon source maps and radon probability maps. The expected indoor radon concentrations could be computed from a particular source datum and nominal house characteristics.

Keywords: *Radon, *Mapping, *Florida, *Residential buildings, Environmental monitoring, Pollution control, Soils, Stationary sources, Indoor air pollution, Feasibility, Statistical analysis, Public health.

PB91-217380/REB PC **A05**/MF **A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Wetlands Detection Methods Investigation.
Lockheed Engineering and Sciences Co., Inc., Las Vegas, NV.
K. H. Lee. Jun 91, 81p EPA/600/4-91/014
Contract EPA-68-C0-0050
Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

The purpose of the investigation was to research and document the application of remote sensing technology for wetlands detection. Various sensors and platforms are evaluated for: suitability to monitor specific wetland systems; effectiveness of detailing wetland extent and capability to monitoring changes; and relative cost-benefits to implementing and updating wetlands database. The environment to be monitored consist of physiographic and ecological wetland resources affected directly or indirectly by anthropogenic activity. Aircraft and satellite remote sensing can be used to record and assess the condition of these resources. Monitoring of environmental conditions is based on the observation and interpretation of certain landscape features. Although some forms of monitoring are continuous, resource monitoring from aircraft and satellite platforms is periodic in nature, with change being documented through a series of observations over a given span of time. The report summarizes the finding of a bibliographic search on the methods used to inventory and/or detect changes in wetlands environments. The bibliography contains numerous citations and is not intended to be all-inclusive. Books, major journal and symposium procedings were examined. The finding documented will provide the potential user with a basic understanding of remote sensing technology as it is applied to wetland monitoring and analysis.

Keywords: *Wetlands, *Remote sensing, *Environmental monitoring, *Water pollution effects, Technology utilization, Aerial surveys, Satellite observation, Trends, Ecosystems, Landscaping, Thematic mapping, Sensors, Platforms, Benefit cost analysis.

PB91-217398/REB PC **A04**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
AHERA Clearance at Twenty Abatement Sites. Final rept.
IT Environmental Programs, Inc., Cincinnati, OH.
J. R. Kominsky, R. W. Freyberg, J. A. Brownlee, and D. R. Gerber. Jul 91, 62p EPA/600/2-91/028
Contracts EPA-68-03-4006, EPA-68-C0-0016
Prepared in cooperation with New Jersey State Dept. of Health, Trenton. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A study was conducted during the summer of 1988 to document Asbestos Hazard Emergency Response Act (AHERA) clearance air-sampling practices and clearance concentrations of airborne asbestos at 20 asbestos-abatement sites in New Jersey. Each abatement took place in a school building and involved removal of surfacing material, thermal system insulation, or suspended ceiling tiles. The study shows that AHERA sampling and analytical requirements and recommendations are not completely understood and followed by consultants conducting clearance air monitoring. AHERA clearance discrepancies exist between sample analyses reported by consultants representing the building owners and those reported independently by the New Jersey Department of Health/U.S. Environmental Protection Agency. The study further suggests that the choice of a clearance reference point may determine whether a site is considered acceptable for occupancy.

Keywords: *Air pollution abatement, *Indoor air pollution, *School buildings, *Asbestos, *Air pollution monitoring, New Jersey, Construction materials, Site surveys, Concentration(Composition), Risk assessment, Graphs(Charts), *Asbestos Hazard Emergency Response Act.

PB91-217406/REB PC **A07**/MF **A02**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Swelling Properties of Soil Organic Matter and Their Relation to Sorption of Non-Ionic Organic Compounds. Final rept. 1 Aug 88-30 Sep 90.
ManTech Environmental Technology, Inc., Ada, OK.
W. G. Lyon, and D. E. Rhodes. Jul 91, 139p EPA/600/2-91/033
Contract EPA-68-C8-15
Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

A method has been developed to measure the swelling properties of concentrated natural organic materials in various organic liquids, and has been applied to various peat, pollen, chitin and cellulose samples. The swelling of these macromolecular materials is the volumetric manifestation of bulk sorption, i.e., sorption by dissolution (or partitioning) of the sorbed liquids into the macromolecular solid phase. Direct evidence for the existence of the category of sorbed materials has been obtained for soil organic materials by the present research; swelling in liquids has long been known in coals and polymers. Bulk sorbed molecules are thought to be inaccessible to direct biological attack, and may represent a continuing source of low-level rebound contamination of groundwater at a polluted site. Equilibration of bulk-sorbed molecules with liquid phases surrounding the particles is kineticalty slow (diffusion limited) relative to sorption and fluid movement, and this sluggishness is probably responsible for some nonequilibrium sorption phenomena seen in soil column flow experiments. Molecules with molar volumes greater than about 93 cc/mole appear to be strongly excluded from sorption inside the soil organic materials studied in the work. In contrast, cellulose excluded molecules with molar volumes greater than about 88 cc/mole. Extensive bibliographies included.

Keywords: *Humic acids, *Pollen, *Chitins, *Cellulose, *Swelling, *Sorption, Soil chemistry, Organic soils, Partition, Ground water, Organic solvents, *Soil organic matter.

PB91-217919/REB PC **A08**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Drinking Water Research Div.
Effect of Bromide on Chlorination Byproducts in Finished Drinking Water. Doctoral thesis.
Cincinnati Univ., OH.
H. Pourmoghaddas. Jul 91, 155p EPA/600/2-91/036
Contract EPA-68-03-4038
Sponsored by Environmental Protection Agency, Cincinnati, OH. Drinking Water Research Div.

To investigate the role of bromide ion concentration on formation and speciation of non-trihalomethanes (non-THMs) chlorination organic byproducts, a two block full factorial matrix was designed to statistically evaluate the influence of various parameters which are relevant to drinking water treatment. The first block used a high chlorine dose and the second block a low dose. The factorial design incorporated one factor (Br) at four levels and two factors (time, pH) at three levels for each block. The percent of total organic halogen (TOX) attributed to 9 haloacetic acids (HAAs), 4 THMs, 3 dihaloacetonitriles (DHANs) (each as a group) and individual THMs and HAAs were determined. Br in chlorinated humic acid solution was shown to shift the distribution of THMs, HAAs and DHANs to more brominated species. The percentage of TOX made up of total THMs plus total HAAs significantly increases with increasing pH and bromide concentration. THMs were the largest class of chlorination byproduct detected on a weight basis, and the HAAs were found to be the second largest portion of the TOX at high pH in drinking water.

Keywords: *Bromides, *Chlorination, *Potable water, *Water treatment, Disinfection, By-products, Water chemistry, Chlorine organic compounds, pH, Bromine organic compounds, Water pollution, Statistical analysis, Graphs(Charts), Tables(Data).

PB91-218016/REB PC **A15**/MF **A03**
Environmental Monitoring Systems Lab., Las Vegas, NV. Exposure Assessment Research Div.
Handbook of Methods for Acid Deposition Studies. Laboratory Analyses for Soil Chemistry.
Lockheed Engineering and Sciences Co., Inc., Las Vegas, NV.
L. J. Blume, P. W. Schumacher, K. A. Schaffer, K. A. Cappo, and M. L. Papp. Sep 90, 331p EPA/600/4-90/023
Contract EPA-68-03-3249

Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV. Exposure Assessment Research Div.

The handbook describes methods used to process and analyze soil samples. It is intended as a guidance document for groups involved in acid deposition monitoring activities similar to those implemented by the Aquatic Effects Research Program of the National Acid Precipitation Assessment Program. These methods were developed for use in the Direct/Delayed Response Project, a component project of the Aquatic Effects Research Program within the Office of Ecological Processes and Effects Research. The program addresses the following issues relating to the effects of acid deposition on aquatic ecosystems: The extent and magnitude of past change; The change to be expected in the future under various deposition scenarios; The maximum rates of deposition below which further change is not expected; and The rate of change or recovery of aquatic ecosystems if deposition rates are decreased. Chemical and physical parameters were measured during the Direct/Delayed Response Project and are described in the document.

Keywords: *Soil analysis, *Soil chemistry, *Deposition, *Handbooks, *Acidification, *Water pollution effects, pH, Land pollution, Chemical analysis, Sample preparation, Aquatic ecosystems, Ion exchanging, Organic matter, Quality control, Environmental monitoring, US EPA, Chemical properties, Physical properties, Laboratories, Rocks, Density(Mass/volume), National Acid Precipitation Assessment Program, Aquatic Effects Research Program.

PB91-218024/REB PC A02/MF A01
Pesticide Fact Sheet Number 225: Zinc Borate.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
15 Jul 91, 7p EPA/540/FS-91/139

The document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on zinc borate, a fungicide. A Fact Sheet is issued after one of the following actions has occurred: Issuance or reissuance of a registration standard, Issuance of each special review document, Registration of a significantly changed use pattern, Registration of a new chemical, or An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

Keywords: *Pesticides, *Fungicides, *Toxic substances, Hazardous materials, Physical properties, Regulations, Toxicology, Ecology, Mutagenicity tests, *Zinc borate, Path of pollutants, Chemical information fact sheet, Use patterns, Science findings.

PB91-218685/REB PC A07/MF A02
Handbook of Wetland Plants of the Rocky Mountain Region.
Environmental Protection Agency, Denver, CO. Region VIII.
D. J. Cooper. 1989, 131p

The booklet is provided as a guide to the botanical component of wetland identification in the Rocky Mountain region. It is intended to introduce those interested in wetland identification to many of the dominant and characteristic species and genera in the flora of this region. With each species is a brief description of the features most useful for identifying each plant, notes on the ecology of the species, synonomy, geographic range, and rand on the National Wetlands Inventory lists of the U.S. Fish and Wildlife Service. It is not intended to be a comprehensive treatment of the wetland flora of the Rocky Mountain Region. The booklet is illustrated with line drawings of each species described, drawn by Kris Meiring.

Keywords: *Plants(Botany), *Catalogs, *Taxonomy, Drawings, Grasses, Trees, *Wetland plants, *Rocky Mountain Region(United States), Shrubs.

PB91-218693/REB PC A03/MF A01
Environmental Protection Agency, Washington, DC. Stationary Source Compliance Div.
Asbestos/NESHAP Adequately Wet Guidance.
Alliance Technologies Corp., Chapel Hill, NC.
R. Shafer, S. Throwe, O. Salgado, C. Garlow, and E. Hoerath. Dec 90, 20p EPA/340/1-90/019
See also PB91-218701.Color illustrations reproduced in black and white. Sponsored by Environmental Protection Agency, Washington, DC. Stationary Source Compliance Div.

The Asbestos NESHAP requires facility owners and/or operators involved in demolition and renovation activities to control emissions of particulate asbestos to the outside air because no safe concentration of airborne asbestos has ever been established. The primary method used to control asbestos emissions is to adequately wet the Asbestos Containing Material (ACM) with a wetting agent prior to, during and after demolition/renovation activities. The purpose of the document is to provide guidance to asbestos inspectors and the regulated community on how to determine if friable ACM is adequately wet as required by the Asbestos NESHAP.

Keywords: *Air pollution standards, *Asbestos, *Wet methods, *Air pollution abatement, Guidelines, Materials handling, Waste disposal, Manufacturing, Industrial wastes, Pollution regulations, Inspection, Standards compliance, *National Emissions Standards for Hazardous Air Pollutants, Clean Air Act of 1970.

PB91-218701/REB PC A03/MF A01
Environmental Protection Agency, Washington, DC. Stationary Source Compliance Div.
Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance.
Alliance Technologies Corp., Chapel Hill, NC.
R. Shafer, S. Throwe, O. Salgado, C. Garlow, and E. Hoerath. Dec 90, 25p EPA/340/1-90/018
See also PB91-218693. Sponsored by Environmental Protection Agency, Washington, DC. Stationary Source Compliance Div.

In the initial Asbestos NESHAP rule promulgated in 1973, a distinction was made between building materials that would readily release asbestos fibers when damaged or disturbed and those materials that were unlikely to result in significant fiber release. The terms 'friable' and 'nonfriable' were used to make this distinction. EPA has since determined that, if severely damaged, otherwise nonfriable materials can release significant amounts of asbestos fibers. 'Regulated Asbestos-Containing Material' (RACM) is (a) friable asbestos material, (b) Category I nonfriable ACM that has become friable, (c) Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations. The purpose of the document is to assist asbestos inspectors and the regulated community in determining whether or not a material is RACM and thus subject to the Asbestos NESHAP.

Keywords: *Pollution regulations, *Air pollution standards, *Air pollution abatement, *Materials handling, Building materials, Construction materials, Inspection, Guidelines, Procedures, *National Emissions Standards for Hazardous Air Pollutants, Clean Air Act of 1970.

PB91-218933/REB PC A02/MF A01
National QA Standard for Environmental Programs for Hazardous Waste Management Activities. Conference paper.
Environmental Protection Agency, Washington, DC. Quality Assurance Management Staff.
G. L. Johnson, and N. W. Wentworth. 15 May 91, 10p EPA/600/D-91/140
Presented at the Waste Testing and Quality Assurance Symposium (7th), Washington, DC., July 9, 1991.

The clean-up of Federally-owned facilities contaminated by mixtures of hazardous chemical and radioactive wastes involves critical decisions based on environmental data. Federal agencies are currently using several different standards or sets of requirements, including U.S. Environmental Protection Agency (EPA) guidance, for establishing the quality assurance and quality control (QA/QC) procedures for these sites. Shortcomings in these standards have led to efforts by several public and private sector groups to develop a uniform, consistent standard that produces the needed type and quality of environmental data in a more cost-effective manner. These efforts are being conducted under the auspices of the American Society for Quality Control (ASQC) and involve participation by EPA, the Department of Energy (DOE), Department of Defense (DOD), Nuclear Regulatory Commission (NRC), and others in the contractor and regulated communities. The paper describes the progress which has been made toward establishing a consensus standard and associated requirements for use by DOE, EPA, and others for hazardous waste management activities. It is expected that the proposed standard will provide the basis for a needed revision and expansion of EPA guidance.

Keywords: *Radioactive wastes, *Waste management, *Federal agencies, Mixtures, Hazardous materials, Quality assurance, Quality control, Pollution regulations, US EPA, Requirements, *Pollution standards.

PB91-218941/REB PC A03/MF A01
Importance of Quality for Collection of Environmental Samples. Planning, Implementing, and Assessing Field Sampling Quality at CERCLA Sites. Conference paper.
Environmental Protection Agency, Washington, DC. Quality Assurance Management Staff.
G. L. Johnson, and A. F. Haeberer. 26 Jun 91, 12p EPA/600/D-91/141

The most neglected aspects of environmental data collection operations have been in the areas of sampling design and sample collection. For years, most major environmental data QA/QC efforts have focused on the laboratory operations, with either the tacit assumption that sampling activities had been properly designed and implemented, or with very little attention given at all to the quality of field or sampling operations. Infrequent data quality analyses did result in the recognition that major error sources were undoubtedly associated with the sampling components of environmental data collection. However, little was generally done to address or remedy these recognized data quality shortfalls. The paper will illustrate the importance of adequate planning, implementation, and assessment of field sampling work in the context of the Environmental Protection Agency's Superfund program.

Keywords: *Superfund, *Sampling, *Site surveys, *Waste disposal, *Management planning, Field tests, Assessments, Implementation, Quality assurance, Quality control, Data processing.

PB91-218958/REB PC A03/MF A01
Monetizing the Pharmacological Benefits of Plants. Draft rept.
Environmental Protection Agency, Washington, DC. Office of Modeling, Monitoring Systems and Quality Assurance.
P. P. Principe. Apr 91, 46p EPA/600/D-91/142

Plants have always had a major role in medicine and public health, and the pharmacological potential of plants has been one of the major reasons for preserving biodiversity. While their value has been appreciated in a qualitative sense, national policy-making, which relies on benefit-cost analyses, requires a quantitative valuation. In addition to its utility in providing a basis for estimating the economic consequences of the loss of biodiversity, the pharmacological potential of plants may also be one of the most easily estimated indicators of ecosystem value. The market value of plant-based prescription drugs in the United States in 1990 is estimated to be $15.5 billion (retail). Given current extinction rates and the estimated likelihood of developing new, marketable pharmaceutical products, the annual market benefit in the United States expected to be foregone as a result of plant extinction is about $150 million. The present value in 1991 of the foregone benefit in 2050 is about $3 billion--which includes only market value. Methodological issues related to the estimation of the economic value of plant-based pharmaceuticals are discussed, and the economic value of plant-based anti-cancer drugs is estimated.

Keywords: *Medicinal plants, *Pharmacology, *Drug industry, Economic analysis, Terrestrial ecosystems, Antineoplastic agents, Public health, Market value, Biological diversity.

PB91-218966/REB PC A02/MF A01
MOUSE: A Computerized Uncertainty Analysis System. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
A. J. Klee. c1990, 9p EPA/600/J-90/533

Pub. in Hazardous Waste and Hazardous Materials, v7 n4 p373-384, Fall 1990. See also PB90-172560.

MOUSE (an acronym for Modular Oriented Uncertainty System) deals with the problem of uncertainties in models that consist of one or more algebraic equations. It was especially designed for use by those with little or no knowledge of computer languages, programming or simulation. It is designed to be run on almost any personal computer, easy and fast to learn, and has all of the features needed for substantive uncertainty analysis. Moreover, a series of unique companion utility programs write much of the necessary computer code for the user, help in analyzing sample data to determine the probability distributions that best fit that data, check each program for errors in syntax, and assist in finding logical errors in the model that is subject to uncertainty. Some typical examples of the use of MOUSE within the U.S. Environmental Protection Agency include: studying the migration of pollution plumes in streams, establishing regulations for hazardous wastes in landfills, and estimating pollution control costs.

Keywords: *Hazardous materials, *Waste disposal, Waste management, Earth fills, Monte Carlo method, Mathematical models, Computerized simulation, Risk analysis, Uncertainty, Fortran, Reprints, *MOUSE system.

PB91-218974/REB PC **A03**/MF **A01**
Environmental Protection Agency, Las Vegas, NV.
Gas Chromatographic/Mass Spectrometric Approach for Isomer-Specific Environmental Monitoring of the 1700 Bromo-, Chloro-, and Bromochloro-Dibenzo-p-Dioxins. Journal article.
Lockheed Engineering and Sciences Co., Inc., Las Vegas, NV. Environmental Programs Office.
J. R. Donnelly, W. D. Munslow, A. H. Grange, T. L. Pettit, and G. W. Sovocool. c1991, 11p EPA/600/J-91/139
Contract EPA-68-03-3249
Pub. in Biological Mass Spectrometry, v20 p329-337 1991. Sponsored by Environmental Protection Agency, Las Vegas, NV.

A combined approach using gas chromatographic retention indices and mass spectrometric characteristics has been elaborated for the isomer-specific identification of the 1700 bromo-, chloro- and bromochlorodioxins which may be found in the environment. Over 100 dioxins were synthesized to develop this approach. The environmental monitoring strategy allows qualitative and quantitative monitoring of the 2,3,7,8-substituted isomers, which are considered to be more toxic, and many of which have assigned toxicity equivalency factors. (Copyright (c) 1991 by John Wiley and Sons, Ltd.)

Keywords: *Environmental monitoring, *Chemical analysis, *Dioxins, Gas chromatography, Mass spectroscopy, Isomerization, Polychlorinated dibenzodioxins, Halogen organic compounds, Reprints, Polybrominated dibenzodioxins, Polybromochloro dibenzodioxins.

PB91-218982/REB PC **A02**/MF **A01**
Effect of Residual Splenic Function and Folate Levels on the Frequency of Micronucleated Red Blood Cells in Splenectomized Humans. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
D. M. Schreinemachers, and R. B. Everson. c1991, 7p EPA/600/J-91/140
Pub. in Mutation Research, v236 n2 p63-67 Jun 91.

Frequencies of micronucleated erythrocytes in the peripheral blood of splenectomized individuals can be used as an index of genetic damage to erythrocyte precursor cells in the bone marrow. This is in contrast to non-splenectomized humans, whose micronucleated erythrocytes are removed by the spleen. Many subjects whose spleen has been removed surgically have residual spleen tissue and consequent residual spleen function (RSF), which can be measured by the percentage of 'pitted' peripheral red blood cells. In the study, evidence of RSF was associated with decreased rates of micronucleated erythrocytes. Analysis of data limited to subjects with minimal spleen function suggested an inverse association between the incidence of micronucleated erythrocytes and serum folate levels that was not apparent in the absence of stringent control for RSF. (Copyright (c) 1991 Elsevier Science Publishers B.V.)

Keywords: *Spleen, *Folic acid, *Erythrocytes, *Micronucleus tests, Ribonucleic acids, Splenectomy, Mutations, Reprints.

PB91-218990/REB PC **A02**/MF **A01**
Microcosm for Measuring Survival and Conjugation of Genetically Engineered Bacteria in Rhizosphere Environments. Journal article.
Corvallis Environmental Research Lab., OR.
M. V. Walter, L. A. Porteous, V. J. Prince, L. Ganio, and R. J. Seidler. c1991, 7p EPA/600/J-91/141
Pub. in Current Microbiology, v22 p117-121 1991. Prepared in cooperation with NSI Technology Services Corp., Corvallis, OR., and Oregon State Univ., Corvallis.

A microcosm is described to evaluate and measure bacterial conjugation in the rhizosphere of barley andd radish with strains of Pseudomonas cepacia. The purpose was to describe a standard method useful for evaluating the propensity of genetically engineered microorganisms (GEMs) to transfer DNA to recipient bacteria. Results demonstrated the formation of transoon jugants from the rhizosphere of each plant 24 h after inoculation. Transconjugant populations peaked at 180 colony forming units (CFU)/g root and associated soil in barley and 200 CFU/g root and associated soil in radish; they then declined over the next five days of the experiment. No significant differences were found in the survival of transconjugant populations monitored from the two plant species. The microcosm was also used to document the formation of false positive transcojugants, which resulted from donor and recipient P. cepacia mating on the surface of selective agar plates instead of in microcosms. Transconjugants resulting from such plate mating occurred in substantial numbers during the first 5 days of the experiment but declined to undetectable numbers by day 7. The use of nalidixic acid was investigated to determine the magnitude of plate mating. The number of transconjugants detected from radish rhizosphere was reduced by two orders of magnitude by including nalidixic acid in the plating medium; this indicated that 99% of the transconjugants were a result of plate mating. (Copyright (c) 1991 Springer-Verlag New York Inc. 1991.)

Keywords: *Genetic engineering, *Pseudomonas, *Genetic conjugation, Soil microbiology, Brassica, Microbial colony count, Species diversity, Barley plants, Reprints, *Radish plants, Rhizosphere environments.

PB91-219006/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Diurnal Curves of Tropospheric Ozone in the Western United States. Journal article.
NSI Technology Services Corp., Corvallis, OR. Environmental Research Lab.
M. Boehm, B. McCune, and T. Vandetta. c1991, 16p EPA/600/J-91/142
Pub. in Atmospheric Environment, v25A n8 p1577-1590 1991. Prepared in cooperation with Oregon State Univ., Corvallis. Sponsored by Corvallis Environmental Research Lab., OR., and Western Conifers Research Cooperative, Corvallis, OR.

Diurnal curves of tropospheric ozone are characterized for the areas near coniferous forests in the western U.S. A given day of hourly data can be placed into one of 17 classes of diurnal curves simply by knowing the 24-h mean and coefficient of variation or range, or more precisely, by applying equations derived from our discriminant analysis. The variation among curves is shown to be related to theory of ozone formation, scavenging, and transport. Season, latitude, and position relative to source areas affect the form of the diurnal curve. (Copyright (c) 1991 Pergamon Press plc.)

Keywords: *Ozone, *Air pollution effects(Plants), *Coniferous trees, *Diurnal variations, Troposphere, Environmental transport, Concentration(Composition), Exposure, Tables(Data), Graphs(Charts), Discriminate analysis, Reprints, *Western Region(United States), Dose-response relationships.

PB91-219014/REB PC **A02**/MF **A01**
Physiological and Biochemical Responses of Bush Bean ('Phaseolus vulgaris') to Ozone and Drought Stress. Journal article.
Corvallis Environmental Research Lab., OR.
J. Bender, D. T. Tingey, H. J. Jaeger, K. D. Rodecap, and C. S. Clark. c1991, 8p EPA/600/J-91/143
Pub. in Jnl. of Plant Physiology, v137 p565-570 1991. Prepared in cooperation with Bundesforschungsanstalt fuer Landwirtschaft, Brunswick (Germany, F.R.). Inst. fuer Produktions- und Okotoxikologie.

Bush bean (Phaseolus vulgaris L.) plants were exposed to ozone (O3) episodes in open-top field chambers in early and late season studies at Corvallis, Oregon. Plants were grown in cultural systems that controlled plant water status. The 7-h seasonal mean O3 concentrations were 0.067 and 0.054 ppm for the early and late season experiments, respectively. At anthesis, part of the plants were subjected to a drought-stress treatment that was maintained for 14 days, after which it was relieved. Both O3 and drought-stress treatments affected physiological and biochemical processes in beans during their reproductive stages of development. Measurements of water potential, osmotic potential and relative water content revealed a mild leaf drought stress in plants grown under water deficit conditions. Drought stress increased the foliar concentrations of several nutrients (Mg, K, Fe, S, P), while O3 exposure had very little effect. At final harvest when plants had reached pod maturation, the concentrations of total soluble sugars were reduced by O3. Both O3 and drought stress significantly affected the sum of free amino acids. Of all amino acids quantified, proline showed the most remarkable increase (up to three-fold) to drought stress. Ozone exposure impaired osmoregulation to drought stress. (Copyright (c) 1991 by Gustav Fischer Verlag, Stuttgart.)

Keywords: *Air pollution effects(Plants), *Ozone, *Drought, *Biochemistry, *Plant physiology, Dose-response relationships, Nutrients, Amino acids, Carbohydrates, Reprints, *Bush beans, Phaseolus vulgarus.

PB91-219022/REB PC **A02**/MF **A01**
Effects of 2,4-Dichlorophenol, a Metabolite of a Genetically Engineered Bacterium, and 2,4-Dichlorophenoxyacetate on Some Microorganism-Mediated Ecological Processes in Soil. Journal article.
Corvallis Environmental Research Lab., OR.
K. A. Short, J. D. Doyle, R. J. King, R. J. Seidler, and G. Stotzky. c1991, 9p EPA/600/J-91/144
Pub. in Applied and Environmental Microbiology, v57 n2 p412-418 Feb 91. Prepared in cooperation with NSI Technology Services Corp., Corvallis, OR. Environmental Research Lab., New York Univ., NY. Dept. of Biology, and Michigan Univ., Ann Arbor. Medical School.

A genetically engineered microorganism, Pseudomonas putida PP0301 (pR0103), and the plasmidless parent strain, PP0301, were added at approximately ten to the seventh CFU/g of soil amended with 500 ppm of 2,4-dichlorophenoxyacete (2,4-D) (500 microgram/g). The degradation of 2,4-D and the accumulation of a single metabolite, identified by gas chromatography-mass spectrophotometry as 2,4-dichlorophenol (2,4-DCP), occurred only in soil inoculated with PP0301 (pR0103), wherein 2,4-DCP accumulated to >70 ppm for 5 weeks and the concentration of 2,4-D was reduced to <100 ppm. Coincident with the accumulation of 2,4-DCP was a >400-fold decline in the numbers of fungal propagules and a marked reduction in the rate of CO2 evolution, whereas 2,4-D did not depress either fungal propagules or respiration of the soil microbiota. 2,4-DCP did not appear to depress the numbers of total heterotrophic, sporeforming, or chitin-utilizing bacteria. (Copyright (c) 1991, American Society for Microbiology.)

Keywords: *Genetic engineering, *Pseudomonas, *Soil microbiology, *Terrestrial ecosystems, *Pesticides, Soil contamination, Mass fragmentography, Metabolism, Glucose, Plasmids, Fungi, Toxicity, Kinetics, Reprints, *Dichlorophenols, *Dichlorophenoxyacetates.

PB91-219030/REB PC **A02**/MF **A01**
Comparison of Seasonal Patterns of Photosynthate Production and Use in Branches of Red Spruce Saplings at Two Elevations. Journal article.
Corvallis Environmental Research Lab., OR.
C. P. Andersen, S. B. McLaughlin, and W. K. Roy. c1991, 9p EPA/600/J-91/145
Pub. in Canadian Jnl. of Forestry Research, v21 p455-461 1991. Also pub. as Oak Ridge National Lab., TN. pub. no. 3640. Prepared in cooperation with Oak Ridge National Lab., TN.

Seasonal patterns of carbon transport from (14)C-labeled foliage were examined in red spruce (Picea rubens Sarg.) branches at 1935 and 1720m elevations in the Great Smoky Mountains National Park to characterize possible physiological mechanisms underlying the observed reductions in growth at high elevations. Current and 1-year-old foliage was labeled on 5- to 7-year old branches of sapling-sized trees in June, August, and October. Retention of (14)C was measured after 24 h, and allocation to other branch segments was characterized after 7 days. Total (14)C-labeled carbon assimilation was greater in current than in 1-year-old foliage throughout the growing season. This suggests that photosynthetic capacity is high in developing foliage prior to needle maturity and remains high during the first growing season. In August, (14)C retention in labeled foliage was less at the higher than at the lower elevation site, possibly reflecting increased respiratory losses that had been previously reported at the higher site. Retention of (14)C in current-year shoots as a percent of (14)C remaining after 7 days, a measure of sink strength, was high at both sites in June and remained high throughout the season in current-year shoots at the higher elevation site. The relatively high sink activity coupled with the large apportionment of biomass to current-year shoots (19.9 and 26.7% of total branch biomass at the lower and higher elevation sites, respectively) may make red spruce particularly susceptible to stresses such as winter injury that affect young foliage. In addition, the relatively greater sink activity of current-year shoots at the higher elevation site in August and October suggests that the contribution of current-year foliage to overall tree growth may be less at the higher than at the lower elevation site.

Keywords: *Seasonal variations, *Trees, *Photosynthesis, Comparative analysis, Plant growth, Biological transport, Rain, Carbon 14, Forest trees, Plant physiology, Reprints, *Photosynthates, *Red spruce trees, Picea rubens, Great Smoky Mountains National Park.

PB91-219048/REB PC **A02/MF A01**
Trajectory of Aerosol Droplets from a Sprayed Bacterial Suspension. Journal article.
Corvallis Environmental Research Lab., OR.
B. Lighthart, B. T. Shaffer, B. Marthi, and L. Ganio.
c1991, 10p EPA/600/J-91/146
Pub. in Applied and Environmental Microbiology, v57 n4 p1006-1012 Apr 91. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR.

Simulated droplet trajectories of a polydispersed microbial aerosol in a laminar air flow regimen were compared with observed dispersal patterns of aerosolized Bacillus subtilis subsp. niger spores in quasilaminar airflow. Simulated dispersal patterns could be explained in terms of initial droplet sizes and whether the droplets evaporated to residual aeroplanktonic size before settling to the ground. For droplets that evaported prior to settling out, a vertical downwind size fractionation is predicted in which the microbial residue of the smallest droplets settles the least, and is found in the airstream at about sprayer height, and progressively larger droplet residues settle to progressively lower heights. Observations of spore particle size distributions downwind from a spray source support the simulation. As predicted by the simulation, the aerosol settled and progressed downwind, with the number of small droplets and particles increasing in proportion to the height and distance downwind.

Keywords: *Bacillus subtilis, *Aerosols, Bacterial spores, Particle size, Spatial distribution, Altitudes, Wind, Mathematical models, Reprints, Aeroplankton.

PB91-219055/REB PC **A03/MF A01**
Video Image Analysis System for Concentration Measurements and Flow Visualization in Building Wakes. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
J. T. Lee, D. L. Call, R. E. Lawson, W. E. Clements, and D. E. Hoard. c1991, 17p EPA/600/J-91/147
Pub. in Atmospheric Environment, v25A n7 p1211-1225 1991.Color illustrations reproduced in black and white. Prepared in cooperation with Los Alamos National Lab., NM.

A video image analysis technique for concentration measurements and flow visualization was developed for the study of diffusion in building wakes and other wind tunnel flows. Smoke injected into the flow was photographed from above with a video camera, and the video signal was digitized in real time during the experiment and during playback with a video image analysis system. The relation between the digitized smoke intensity and the vertically integrated concentration of smoke particles was obtained from calibration experiments in which the smoke was replaced by a mixture of ethane and air. The time-averaged vertically-integrated concentration of the ethane tracer was measured at discrete points throughout the flow field and correlated with the time-averaged smoke intensity data. After the system was calibrated, the instantaneous and time-averaged fields of vertically integrated concentration were obtained by simply photographing the smoke plume. Color-contoured images of the plume were created and displayed in real time thus creating a pseudo-color movie that was very useful for flow visualization. The technique was used to study the effects of building geometry and source location on the concentration and flow patterns in building wakes. (Copyright (c) 1991 Pergamon Press plc.)

Keywords: *Image analysis, *Flow visualization, *Buildings, *Wakes, *Video equipment, Image processing, Plumes, Signal processing, Test facilities, Calibration, Diffusion, Smoke, Fluid flow, Wind tunnel tests, Reprints.

PB91-219063/REB PC **A03/MF A01**
Flow and Dispersion of Pollutants Within Two-Dimensional Valleys, 1991. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
W. H. Snyder, L. H. Khurshudyan, I. V. Nekrasov, R. E. Lawson, and R. S. Thompson. c1991, 29p EPA/600/J-91/150
Pub. in Atmospheric Environment, v25A n7 p1347-1375 1991. See also PB91-196337. Prepared in cooperation with Main Geophysical Observatory, Leningrad (USSR), and Moscow State Univ. (USSR).

Wind-tunnel experiments and a theoretical model concerning the flow structure and pollutant diffusion over two-dimensional valleys of varying aspect ratio are described and compared. Three model valleys were used, having small, medium, and steep slopes. Measurements of mean and turbulent velocity fields were made upstream, within, and downwind of each of these valleys. Concentration distributions were measured downwind of tracer sources placed at an array of locations within each of the valleys. The data are displayed as maps of terrain amplification factors, defined as the ratios of maximum ground-level concentrations in the presence of the valleys to the maxima observed from sources of the same height located in flat terrain. Maps are also provided showing the distance to locations of the maximum ground-level concentrations. The concentration patterns are interpreted in terms of the detailed flow structure measured in the valleys. These data were also compared with results of a mathematical model for treating flow and dispersion over two-dimensional complex terrain. This model used the wind-tunnel measurements to generate mean flow fields and eddy diffusivities, and these were applied in the numerical solution of the diffusion equation. Measured concentration fields were predicted reasonably well by this model for the valley of small slope and somewhat less well for the valley of medium slope. Because flow separation was observed within the steepest valley, the model was not applied in this case.

Keywords: *Pollution transport, *Air pollution, *Valleys, *Atmospheric boundary layer, *Atmospheric diffusion, Laboratory tests, Wind tunnels, Mathematical models, Graphs(Charts), Simulation, Reprints.

PB91-219071/REB PC **A02/MF A01**
Sediment- and Saturated-Soil-Associated Reactions Involving an Anionic Surfactant (Dodecylsulfate). 1. Precipitation and Micelle Formation. Journal article.
Environmental Research Lab., Athens, GA.
C. T. Jafvert, and J. K. Heath. c1991, 10p EPA/600/J-91/151
Pub. in Environmental Science and Technology, v25 n6 p1031-1038 Jun 91. See also PB91-219089. Prepared in cooperation with Technology Applications, Inc., Athens, GA.

In assessing the possible removal of contaminants from soils or sediments by surfactant solutions, the need also arises to elucidate interactions between the surfactants and the components of soils and sediments. Interactions of the anionic surfactant dodecylsulfate (DS) with soil and sediment (medium) components were examined at DS concentrations in the range of the critical micelle concentration (cmc). Experiments involving either the variation in DS (0.1-40 mM) or in medium concentration (0.04-0.36 g/mL for six media) demonstrate the importance of precipitation, micellization, and micellar counterion binding in determining the recovery of aqueous DS from medium slurries. Mechanistic and semiempirical mass action equations, and their associated constants, describing these phenomena in well-defined solutions, along with the necessary material balance equations, permit the calculation of precipitation boundaries. Calculated precipitation boundaries were compared to experimental results. These equations also allow the calculation of the aqueous micelle and monomer DS concentrations. A similar methodology to calculate the aqueous micelle concentration was applied in the subsequent study to quantitatively assess the distribution of PAH compounds among micellar, medium, and dissolved aqueous phases.

Keywords: *Surfactants, *Sediments, *Soil contamination, *Pollution control, Micellar systems, Land pollution control, Water pollution control, Solubility, Sorption, Precipitation(Chemistry), Ion exchanging, Aromatic polyclic hydrocarbons, Experimental design, Reprints, *Dodecylsulfates, Activity coefficients, Calcium dodecylsulfate, Sodium dodecylsulfate, Magnesium dodecylsulfate.

PB91-219089/REB PC **A02/MF A01**
Sediment- and Saturated-Soil-Associated Reactions Involving an Anionic Surfactant (Dodecylsulfate). 2. Partition of PAH Compounds among Phases. Journal article.
Environmental Research Lab., Athens, GA.
C. T. Jafvert. c1991, 9p EPA/600/J-91/152
Pub. in Environmental Science and Technology, v25 n6 p1039-1045 Jun 91. See also PB91-219071.

The distribution of either pyrene, phenanthrene, or naphthalene between several different sediment or soil solid phases (media) and aqueous phases containing dodecylsulfate (DS) micelles was determined. These experimental distributions were compared to distributions calculated from relationships describing the sorption of polycyclic aromatic hydrocarbons (PAHs) to sediments and soils and PAH solubilization by DS micelles, reported in the literature or developed from literature data. The amount of aqueous-phase surfactant in micellar form was calculated from equations describing micelle-monomer equilibria in homogeneous solution. Experimental overall distribution coefficients of pyrene and phenanthrene, measured in five different media at two medium concentrations, generally were within a factor of 3 of the calculated distribution coefficients. The calculated and experimental distributions indicate that, on an organic-carbon-normalized basis (w/w), DS micelles and the natural media have approximately the same affinity or sorption potential for these nonpolar compounds.

Keywords: *Surfactants, *Sediments, *Soil contamination, *Pollution control, Land pollution control, Water pollution control, Aromatic polycyclic hydrocarbons, Micellar systems, Solubility, Sorption, Experimental design, Pyrene, Phenanthrene, Naphthalene, Reprints, *Dodecylsulfates.

PB91-219097/REB PC **A03/MF A01**
Environmental Research Lab., Athens, GA.
New Methods for Modeling the Transport of Metals from Mineral Processing Wastes into Surface Waters. Journal article.
ASci Corp., Athens, GA.
K. P. Brown, and E. Z. Hosseinipour. c1991, 49p EPA/600/J-91/153
Pub. in Jnl. of Environmental Science and Health, vA26 n2 p157-203 Feb 91. Sponsored by Environmental Research Lab., Athens, GA.

The estimation of contaminant fluxes into and within river basins is the aim of the research. These new methods for estimating contaminant loadings and fate on a comprehensive basin scale based on assembled subsite behaviors have been demonstrated for a collection of Superfund sites in the Upper Clark Fork River basin in Montana. This portion of the demonstration illustrates a new set of techniques for estimating the overland and surface water movement of mine

waste constituents. A linked assessment system--consisting of contaminant transformation, nonpoint source and groundwater mixing and transport, surface hydrology and erosion, and surface water quality models--has been developed, written, tested, and applied at the site. Principal portions of the assessment system are described. The object of the project is to show the importance of comparing phenomenological hypotheses with field observations for large-scale exposure models. Graphs of the river copper concentration show a good fit between the measured and predicted concentrations at some stations, whereas substantial deviations from field measurements are observed at other stations along the course of the river. (Copyright (c) 1991 by Marcel Dekker, Inc.)

Keywords: *Metals, *Water pollution, *Mathematical models, *Path of pollutants, *Mine wastes, Montana, Environmental transport, Surface waters, Concentration(Composition), Copper, Site characterization, Land pollution, Field tests, Comparison, Superfund, Clark Fork River, Reprints.

PB91-219105/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Proceedings: EPA/NGA Workshop on Global Climate and State Actions. Held in Research Triangle Park, North Carolina on December 3-4, 1990.
National Governors' Association, Washington, DC.
B. Wells. Jul 91, 16p EPA/600/9-91/024
Grant EPA-R81-3853-02-1
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The proceedings document state and federal efforts described at a December 3-4, 1990, workshop that explored how states have been responding to potential global climate change. Cosponsored by the National Governors' Association (NGA) and the U.S. Environmental Protection Agency (EPA), the proceedings present some of the findings that emerged from discussions among the participants. Despite uncertainty about the extent, rate, and timing of a temperature increase, many state governments are wasting no time in working to reduce their greenhouse gas emissions as research on the effects of these gases continues. Fortunately, nearly all methods to curb emissions of greenhouse gases produce other benefits as well, such as cleaner air, reduced energy costs, and natural resource conservation. Therefore, most programs to reduce emissions will reflect concern about environmental and energy issues as well as global climate change.

Keywords: *Greenhouse effect, *Climatic changes, *Combustion products, *Meetings, Air pollution, Fossil fuels, Carbon dioxide, Methane, Nitrogen oxides, Emission factors, Air pollution control, Stationary sources, State programs, Greenhouse gases.

PB91-219113/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Sampling and Analysis of Municipal Wastewater Sludge Incinerator Emissions for Metals, Metal Species, and Organics.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
W. G. DeWees, C. A. Davis, S. C. McClintock, A. L. Cone, and H. E. Bostian. 1991, 31p EPA/600/D-91/133
Contract EPA-68-02-4462
Presented at the Annual Meeting of the Air and Waste Management Association (83rd), Pittsburgh, PA., June 24-29, 1990. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

There is concern regarding chromium and nickel species in the emissions from incineration of municipal wastewater sludge because of the associated cancer risk. The Environmental Protection Agency's (EPA) Office of Water Regulations and Standards (OWRS) is developing new regulations for sewage sludge incinerators and EPA's Risk Reduction Engineering Laboratory (RREL) has been assisting OWRS in the collection of supporting data. The paper reports new data on emissions of chromium and nickel species and associated emissions needed to respond to public comments. The primary objectives of the portion of the RREL/OWRS research program described in the paper are to determine (1) the ratio of hexavalent chromium to total chromium and (2) the ratio of nickel subsulfide to total nickel in sewage sludge incinerator emissions under several incinerator operating conditions. Secondary objectives include comparing the analytical results for emissions of chromium and nickel subspecies determined by different analytical procedures, and gathering data on other metals and inorganic and organic gaseous components in uncontrolled and controlled incinerator emissions.

Keywords: *Air pollution sampling, *Sludge disposal, *Incineration, *Sewage sludge, Combustion products, Waste disposal, Air pollution detection, Gas analysis, Organic compounds, Metals, Nickel, Chemical analysis, Concentration(Composition), Air pollution control, Chromium.

PB91-219121/REB PC **A03/MF A01**
Development of BDAT Standards for RCRA Wastes.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. J. Turner. 1991, 15p EPA/600/D-91/134
Presented at the Air and Waste Management Association Annual Meeting (84th), Vancouver, B.C., June 16-21, 1991.

Treatment standards have been promulgated for those RCRA wastes subject to the land disposal restrictions. The EPA identified 26 treatment technologies which achieved significant reductions of the concentrations for each waste's constituents. The paper discusses these biological, thermal, and physical/chemical technologies, the factors used by the Agency in defining the BDAT for the various RCRA wastes, and examples of treatment performance tests for the demonstrated technologies.

Keywords: *Waste treatment, *Best technology, Ground disposal, Pollution regulations, Waste disposal, Waste processing, Biological treatment, Physical chemical treatment, Heat treatment, Technology utilization, *Resource Conservation and Recovery Act, *Land Disposal Restrictions, *Pollution Standards.

PB91-219139/REB PC **A03/MF A01**
Quantitative Genetic Activity Graphical Profiles for Use in Chemical Evaluation.
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
M. D. Waters, H. F. Stack, N. E. Garrett, and M. A. Jackson. 1991, 20p EPA/600/D-91/135
Prepared in cooperation with Environmental Health Research and Testing, Inc., Research Triangle Park, NC.

A graphic approach termed a Genetic Activity Profile (GAP) has been developed to display a matrix of data on the genetic and related effects of selected chemical agents. The profiles provide a visual overview of the quantitative (doses) and qualitative (test results) data for each chemical. Either the lowest effective dose (LED) or highest ineffective dose (HID) is recorded for each agent and bioassay. Up to 200 different test systems are represented across the GAP. Bioassay systems are organized according to the phylogeny of the test organisms and the endpoints of genetic activity. The methodology for the production and evaluation of genetic activity profiles has been developed in collaboration with the International Agency for Research on Cancer (IARC). Data on individual chemicals has been compiled by IARC and by the U.S. Environmental Protection Agency (EPA). Data are available on 299 compounds selected from volumes 1-50 of the IARC Monographs and on 115 compounds identified as Superfund Priority Substances. Structurally similar compounds frequently display qualitatively and quantitatively similar profiles of genetic activity. Through the examination of the patterns of GAPs of pairs and groups of chemicals, it is possible to make more informed decisions regarding the selection of test batteries to be used in the evaluation of chemical analogs.

Keywords: *Toxicology, *Mutagenicity tests, *Toxic substances, Bioassay, Structure-activity relationships, Computer software, Deoxyribonucleic acids, Dose-response relationships, Carcinogens, Mutagens, *GAP(Genetic activity profile), GAP data base.

PB91-219147/REB PC **A03/MF A01**
Enhanced Expression of Glial Fibrillary Acidic Protein and the Cupric Silver Degeneration Reaction Can Be Used as Sensitive and Early Indicators of Neurotoxicity.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
J. P. O'Callaghan, and K. F. Jensen. 1991, 31p EPA/600/D-91/136

The mammalian central nervous system is composed of a large and diverse array of its two principle cell types, neurons and glia. Given this extreme cellular heterogeneity, it is not surprising that targets of neurotoxic insult often are diverse and unprepredictable. In devising strategies to assess neurotoxicity, one must overcome the obstacle posed by not knowing where to look for damage. The study's approach to the detection and localization of sites of toxicant-induced damage has been to take advantage of two general responses to nervous system insult, astrogliosis and argyrophilia. Assays of GFAP, the principle intermediate filament protein of astrocytes, have been devised to quantify astrogliosis and a modified cupric silver degeneration stain has been employed to examine patterns of argyrophilia. Using these methods, it was found that increases in GFAP and the occurrence of argyrophilia are consistent responses to neurotoxic insults. Moreover, increments in these two indicators reveal dose-, time-, and region-dependent patterns of neurotoxicity at toxicant dosages below those that cause light microscopic evidence of cell loss or damage. The rapid onset of astrogliosis and argyrophilia following specific toxicant exposures suggests that the signals underlying these events are among the earliest that can be linked to the neurotoxic state.

Keywords: *Toxicity, *Nervous system, *Glial fibrillary acidic protein, *Biological markers, Trimethyltin, Neuroglia, Astrocytes, Neurons, Immunohistochemistry, *Cupric silver degeneration reaction, Methylphenyltetrahydropyridine.

PB91-219154/REB PC **A04/MF A01**
Animal Models for Assessing Developmental Toxicity.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
C. A. Kimmel, R. J. Kavlock, and E. Z. Francis. 1991, 53p EPA/600/D-91/137

A number of animal models have been used to evaluate the developmental effects of exposure to toxicants, and several of these are exemplified by the standard protocols used by regulatory agencies. Others have been developed to evaluate the effects of toxicants on particular target organs or organ systems. Animal models and principles for the interpretation of data from studies involving prenatal exposure are much further advanced than those involving postnatal exposure. In those experimental animal studies that assess the effects of prenatal exposure, the developing organism is exposed secondarily via the maternal organism which intervenes in the absorption, metabolism and distribution to the embryo/fetal compartment. In postatal exposure studies, exposure of the developing offspring may also be indirect via maternal milk or direct by dosing of pups. In addition, exposure may occur unintentionally via contaminants on maternal fur or skin, in excretory products following exposure, and/or by access to dosed food or drinking water before weaning.

Keywords: *Toxicity, *Teratogens, *Maternal-fetal exchange, Graphs(Charts), Tables(Data), Milk, Litter size, Metabolism, Pharmacokinetics, Nervous system, Kidney, Exposure, *Animal models.

PB91-219162/REB PC **A03/MF A01**
Apportionment of Residential Indoor VOC's and Aldehydes to Indoor and Outdoor Sources in Roanoke.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
R. B. Zweidinger, T. E. Kleindienst, and E. Hudgens. 1991, 11p EPA/600/D-91/138
See also PB90-263021. Presented at the Air and Waste Management Association Annual Meeting and Exhibition (84th), Vancouver, British Columbia, June 16-21, 1991. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC.

The average concentrations of a large number of VOC and aldehyde species measured in ten Roanoke, Virginia residences in wintertime have been apportioned according to their contributions from all inside sources and all outside sources. The two category apportionment was accomplished through the use of the single chamber mass balance indoor air quality model given by Dockery and Spengler. While the indoor concentration of some VOC's appeared entirely due to infiltration, most aldehydes had substantial indoor sources. Some homes exhibited very large indoor sources for a few VOC species and two homes appeared contaminated by gasoline vapors. The overall contribution of indoor and outdoor sources to the concentrations of VOC's inside the Roanoke homes is similar to that observed in Boise, ID in a previous study.

Keywords: *Air pollution, *Indoor air pollution, *Air pollution monitoring, *Residential buildings, Concentration(Composion), Volatile organic compounds, Aldehydes, Aerosols, Winter, *Roanoke(Virginia), *Pollution sources.

PB91-219550/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Radiation-Curable Coatings. Final rept. Jun 90-May 91.
Alliance Technologies Corp., Chapel Hill, NC.
S. A. Walata, and C. R. Newman. Jul 91, 48p EPA/600/2-91/035
Contract EPA-68-D9-0173
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report gives results of an evaluation of radiation-curable coatings as a technology for reducing volatile organic compound (VOC) emissions from surface coating operations. A survey of the literature was conducted to assess the state of the technology and emissions from radiation-curable processes. The information collected from the literature was used to evaluate the engineering and economic issues associated with radiation-curable systems and to identify the requirements for implementing the technology and any problems arising from its use. Topics discussed in the report include coating characteristics, potential VOC reduction capability, potential health problems associated with the use of ultraviolet (UV) coatings, and the economic impacts of conversion to UV coatings. The report provides information to permit an informed judgment on when and how to apply radiation-curable technologies for industrial application. Radiation-curable coatings and inks are higher solids formulations than conventional coatings and, consequently from an air pollution viewpoint, are considered to be well suited substitutes for solvent-based thermal-curable systems. The radiation source for these systems is either an UV light or an accelerated electron beam (EB).

Keywords: *Air pollution abatement, *Volatile organic compounds, *Radiation curing, *Coating processes, *Polymeric films, Ultraviolet radiation, Inks, Electron beams, Painting, Photochemical reactions, Polymerization, Chemical properties, Toxicology, Emission factors, Cost analysis.

PB91-219568/REB PC **A05/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Assessment of Soil-Gas Measurement Technologies. Final rept.
Geomet Technologies, Inc., Germantown, MD.
H. E. Rector. Jul 91, 85p EPA/600/8-91/050
Contract EPA-68-D9-0166, DCA-89RD-62-15-00-22-003
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab., and Florida Dept. of Community Affairs, Tallahassee.

The report reviews the technologies for measuring radon in soil gas. It addresses methodologies involving in-situ detection, sample extraction, and surface flux, focusing on identifying the range of options for measuring radon in soil. The following aspects of each measurement approach are evaluated: (1) measurement objectives--the specific parameter(s) that each technology is designed to measure, (2) equipment needs, (3) procedural information, and (4) underlying assumptions. Basic technologies and field data are examined from a generic perspective (e.g., the common denominators of passive detectors, hollow sampling probes, flux monitors) as well as specific configurations developed by individual investigators (e.g., sample volume, depth) to develop the basis for separating analytical uncertainties from sampling uncertainties. Available technologies are also reviewed in terms of theoretical and practical utility as well as cost effectiveness.

Keywords: *Soil gases, *Radon, *Radionuclide migration, Radioactive materials, Technology utilization, Assessments, Permeability, Study estimates, Environmental transport, Procedures, Field tests, Indoor air pollution, Soil properties, Land pollution, Buildings, Measuring equipment.

PB91-219576/REB PC **A09/MF A02**
Corvallis Environmental Research Lab., OR.
Animals as Sentinels of Environmental Health Hazards.
National Research Council, Washington, DC. Committee on Animals as Monitors of Environmental Hazards.
L. T. Glickman, A. Fairbrother, A. M. Guarino, H. L. Bergman, and W. B. Buck. Aug 91, 188p EPA/600/3-91/047
Sponsored by Corvallis Environmental Research Lab., OR.

The Committee on Animals as Monitors of Environmental Hazards was formed when the Agency for Toxic Substance and Disease Registry requested that the National Academy of Sciences gather an NRC committee to review and evaluate the usefulness of animal epidemiologic studies for human risk assessment and recommend the types of data that should be collected. With specific questions in mind, the committee attempted to determine how animals could be used for ecological and human health risk determinations as well as to provide an early-warning system for risk assessment and management.

Keywords: *Animals, *Environmental monitoring, *Health hazards, Epidemiology, Fish, Wildlife, Risk assessment, Dose-response relationships, Exposure, Species diversity, Water pollution effects(Animals), Veterinary medicine.

PB91-219584/REB PC **A04/MF A01**
General Proceedings and Action Agendas from the U.S. Environmental Protection Agency's National Leadership Conference on Building Public-Private Partnerships. Held in Washington, DC. on October 26, 1988. Final rept.
Environmental Protection Agency, Washington, DC. Resource Management Div.
Jan 89, 75p

The proceedings from the first national conference on public-private partnerships include comments from national leaders from business; finance and the environmental movement. Speeches and case studies concern successful and innocative ways the private sector can work with states and municipalities on environmental services.

Keywords: *Meetings, *Financing, *Private organizations, *Environmental quality, *Environmental protection, US EPA, Citizen participation, Drinking water, Sewage treatment, Barriers, Solid waste disposal, Contracts, State government, Local government, Administrative procedures, *Cooperative agreements, *Public/private partnerships, *Alternative financing, Private sector.

PB91-219592/REB PC **A04/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Chemicals Stored in USTs: Characteristics and Leak Detection. Rept. for 23 Apr 90-11 Jan 91.
Vista Research, Inc., Mountain View, CA.
J. W. Maresca, and R. W. Hillger. Aug 91, 69p EPA/600/2-91/037
Contract EPA-68-03-3409
Prepared in cooperation with CDM Federal Programs Corp., Fairfax, VA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The regulations issued by the United States Environmental Protection Agency (EPA) in 1988 require, with several exceptions, that the integrity of underground storage tank systems containing petroleum fuels and hazardous chemicals be routinely tested. The regulatory standards for leak detection in tanks containing hazardous chemicals are more stringent than for those containing petroleum motor fuels. The report describes (1) the regulatory standards for leak detection in tanks containing hazardous chemicals, (2) the types of chemicals being stored, (3) the characteristics of the tanks in which these chemicals are stored, (4) the effectiveness of tank tightness tests and automatic tank gauging systems for detection of leaks in tanks containing chemicals other than petroleum, and (5) the approaches to leak detection that are being implemented by tank owners and operators.

Keywords: *Chemical compounds, *Storage tanks, *Petroleum, *Land pollution abatement, *Leak testing, *Underground storage, Pollution regulations, US EPA, Standards, Materials testing, Fuel tanks, Performance standards, Hazardous materials.

PB91-220293/REB PC **A99/MF A06**
National Biennial RCRA Hazardous Waste Report, 1987.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
8 Jul 91, 628p EPA/530/SW-91/061

The U.S. Environmental Protection Agency (EPA) collects and maintains information about the generation, management, and final disposition of the nation's hazardous waste regulated by the Resource Conservation and Recovery Act (RCRA). The Report presents information for 1987. Data from a total of 18,660 RCRA hazardous waste sites are included in the report. Of these, 17,677 were generators and 3,308 were treatment, storage or disposal facilities. Most sites that are treatment, storage or disposal facilities are also classified as generators.

Keywords: *Hazardous materials, *Management, *Waste disposal, *Pollution control, Sites, Weight(Mass), Sources, Industrial wastes, Manufacturing, Waste water, Texas, New York, Massachusetts, Pennsylvania, Storage, Licenses, Requirements, Water treatment, Ranking, Resource Conservation and Recovery Act.

PB91-220301/REB PC **A05/MF A02**
Report to the Senate Appropriations Committee: Regulation of Wood Preserving Wastes.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Jul 91, 100p EPA/530/SW-91/058

On November 15, 1990, the United States Environmental Protection Agency (EPA) issued a final rule designating three categories of wastes from wood preserving operations as hazardous waste under Subtitle C of the Resource Conservation and Recovery Act (RCRA). The Senate Committee on Appropriations had directed the Agency to submit by March 15, 1991, a Report regarding the potential advantages, costs, and risks associated with a multistatute approach to regulation of wastes from wood preserving operations. The approach would employ three statutory authorities to control wood preserving wastes in the following manner: (1) Clean Water Act (CWA) - regulation of wastewaters and stormwaters; (2) Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) - regulation of treated wood drippage and the establishment of drip pad management standards; (3) Resource Conservation and Recovery Act (RCRA) - regulation of process residuals. The report is in response to the Committee's directive to look at the advantages, costs, and risks of the multistatute approach. To do so, the elements of the multistatute approach are examined qualitatively in Section One. As part of this examination, a comparison of the multistatute elements to analogous RCRA elements is included at various points. In Section Two of the Report, the costs and risks of the multistatute approach are examined, including a comparison to those of the RCRA Subtitle C approach.

Keywords: *Waste management, *Pollution regulations, *Wood preservatives, *Hazardous materials, Administrative procedures, Law enforcement, Benefit cost analysis, Risk assessment, Comparison, Remedial action, Penalties, Comprehensive planning, Resource Conservation and Recovery Act, Clean Water Act, Federal Insecticide Fungicide and Rodenticide Act.

PB91-220350/REB PC **A03**/MF **A01**
RCRA NPL Listing Policy.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
10 Sep 86, 15p OSWER DIRECTIVE-9320.1-5

The directive discusses that on 6/10/86, EPA announced the first phase of a new policy for listing RCRA Subtitle C facilities on the NPL (51 FR 21057-21062 and 21109-21112). The document presents interim guidance for implementation of the new policy and solicits information from the Regions to assist in the final policy development. Specifically this includes the final and proposed RCRA/NPL listing policy; provides a questionnaire for an initial screening of potential NPL sites with respect to their RCRA status; solicits suggestions about effective policy development and implementation from the Regional Offices; and identifies an interim course of action until more definitive guidance is available.

Keywords: *Superfund, *Waste management, *Hazardous materials, Environmental policy, Guidelines, Information transfer, Questionnaires, Implementation, Recommendations, *Office of Solid Waste and Emergency Response, National Priorities List, Resource Conservation and Recovery Act.

PB91-220384/REB PC **A07**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Recovery of Metals from Sludges and Wastewaters.
IT Corp., Cincinnati, OH.
Aug 91, 150p EPA/600/2-91/041
Contract EPA-68-03-3413
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The report covers nine major metal-waste producting industries. Metal treatment and recovery technologies are addressed with respect to factors such as design specifications, waste characteristics affecting performances, availability and cost-effectiveness. The information in the report will assist in identifying waste minimization and management options for metal-bearing sludges and wastewaters.

Keywords: *Materials recovery, *Metals, *Sludge treatment, *Water pollution control, *Hazardous materials, Waste treatment, Industrial wastes, Design criteria, Performance evaluation, Cost effectiveness, Waste management, Waste minimization.

PB91-220392/REB PC **A08**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Opportunity Assessment: A Truck Assembly Plant.
Science Applications International Corp., McLean, VA.
21 Aug 91, 171p EPA/600/2-91/038
Contract EPA-68-C8-0062
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

EPA has developed a systematic approach to identify and implement options to reduce or eliminate hazardous waste. The approach is presented in a report entitled, 'Waste Minimization Opportunity Assessment Manual' (EPA/625/7-88/003). The report describes the application of the waste minimization assessment procedures to a truck assembly facility in Chillicothe, Ohio. This facility volunteered to participate in the project and provided technical support during the study. The relative comparison used in the study indicates that the best options appear to be: (1) reducing paint mix volumes through closer control, (2) minimizing solvent contamination by using a different working container and procedures, and (3) improving transfer efficiency by installing electrostatic painting in the chassis booth. Two options ranked with moderately good scores: (1) dewatering paint solids and recycling the booth waters and chemicals and (2) using ion exchange to recycle the phosphate/E-coat rinse water. The option for bath maintenance on the phosphate/E-coat line ranked last, however still within a reasonable range. One option which recommended procedural and small equipment changes for painting was not evaluated during the feasibility analysis phase, because the costs and savings could not be projected at this time. The associated waste minimization techniques however appear to be technically and economically viable.

Keywords: *Hazardous materials, *Waste management, *Automotive industry, *Trucks, Waste recycling, Coatings, Degreasing, Solvents, Dewatering, Assessments, Feasibility studies, Implementation, Painting, Procedures, *Waste minimization, Source reduction, Chillicothe(Ohio).

PB91-221242/REB PC **A07**/MF **A02**
Office of Radiation Programs, Washington, DC.
National Radon Contractor Proficiency (RCP) Program. Proficiency Report, September 1991.
ICF, Inc., Fairfax, VA.
Sep 91, 141p EPA/520/1-91/024
Contract EPA-68-D90170
See also report for Jun 91, PB91-183566. Sponsored by Office of Radiation Programs, Washington, DC.

The primary objective of the U.S. Environmental Protection Agency's (EPA) efforts to address the indoor radon problem is to reduce radon levels in buildings throughout the country. Achieving this objective requires a nationwide supply of capable radon mitigation contractors. In the Indoor Radon Abatement Act of 1988, Congress authorized EPA to establish a program to evaluate radon mitigation contractors and to provide this information to the public in cooperation with the States. The Radon Contractor Proficiency (RCP) Program was developed to assist States, EPA Regions, local government officials, and the public in selecting contractors who have demonstrated their proficiency in reducing indoor radon levels. The program is managed by the EPA Office of Radiation Programs' Radon Division. Under this voluntary program, radon contractors demonstrate their proficiency by meeting specific Program requirements. Individual contractors who meet these requirements are then listed in the Report.

Keywords: *Radon, *Contractors, *Indoor air pollution, *Air pollution abatement, *Mitigation, Public information, Requirements, Performance standards, Buildings, Guidelines, State government, Listings, Tables(Data), *Radon Contractor Proficiency Program.

PB91-221994/REB PC **A04**/MF **A01**
Alternative Financing for Solid Waste. General Proceedings, Region 4 Conference on Public-Private Partnerships. Held in Atlanta, Georgia on April 19-21, 1989. Final rept.
Environmental Protection Agency, Washington, DC. Resource Management Div.
Jun 89, 62p

The document includes proceedings from a financing solid waste conference held in Atlanta, GA. The focus of the meeting was how private sector involvement could help local governments meet their environmental goals. It included general sessions on financing techniques, barriers to privatization and case studies.

Keywords: *Meetings, *Solid waste management, *Financing, *Financial management, *Private organizations, US EPA, State government, Local government, Case studies, Implementation, Environmental quality, Environmental protection, Barriers, Contracts, *Cooperative agreements, *EPA region 4, *Alternative financing, *Public/private partnerships.

PB91-222000/REB PC **A04**/MF **A01**
Public-Private Partnerships for Environmental Services: Region 3, Conference Proceedings. Final rept.
Environmental Protection Agency, Washington, DC. Resource Management Div.
14 Jun 89, 51p
Proceedings of the Conference, 'Public-Private Partnerships for Environmental Services: Solid Waste, Drinking Water, Wastewater', Philadelphia, PA., June 14, 1989.

The proceeding is from a conference on public-private partnerships concerning the states of Pennsylvania, Delaware, Virginia, Maryland, and West Virginia. They include information on the types of partnerships, opportunities in the region for private involvement, barriers to privatization, and case studies.

Keywords: *Meetings, *Financial management, *Private organizations, *Environmental pollution, *Environmental protection, *Financing, Forecasting, Barriers, Case studies, State government, Pennsylvania, Delaware, Drinking water, Water pollution control, Solid waste management, Contracts, Pollution regulations, Virginia, Maryland, West Virginia, Implementation, US EPA, Local government, *Cooperative agreements, *EPA region 3, *Alternative financing, *Public/private partnerships.

PB91-222026/REB PC **A06**/MF **A02**
Funding Our Environmental Future: General Proceedings, Region 1 Conference on Public-Private Partnerships and Alternative Financing Mechanisms. Held in Northampton, Massachusetts on November 6-7, 1989. Final rept.
Environmental Protection Agency, Washington, DC. Resource Management Div.
Dec 89, 111p

This is perhaps the single most comprehensive document available for information on non-traditional financing approaches for environmental facilities and services. It includes information and case studies on a number of financing techniques including public-private partnerships.

Keywords: *Meetings, *Financing, *Financial management, *Environmental quality, *Environmental protection, *Private organizations, Comprehensive planning, US EPA, Local government, State government, Forecasting, Contracts, Barriers, Funds, Fines(Charges), Taxes, Fees, *Cooperative agreements, *EPA region 1, *Public/private partnerships, *Alternative financing, Private sector, Public sector.

PB91-222034/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Control Technology Center 1990. A Year of Expanding Service. Final rept. Oct 89-Sep 90.
Acurex Corp., Research Triangle Park, NC.
C. H. Darvin, R. J. Blaszczak, and B. Crabtree. Jul 91, 45p EPA/600/9-91/023
Contract EPA-68-D0-0141
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report discusses services provided by EPA's Control Technology Center (CTC) during FY90. The CTC, developed by EPA's Office of Research and Development (ORD) and Office of Air Planning Quality and Standards (OAQPS), is an innovative technical assistance program for state and local air pollution agencies and EPA's regional offices. Since the CTC's inception, its program has expanded to address more than just air toxics issues. It now addresses emission source and control technology problems associated with air toxics, particulate matter, oxides of sulfur and nitrogen, carbon monoxide, lead, PM10, and volatile organic compounds. The CTC is designed to be flexible so that it can respond quickly to many client needs as they arise. The CTC provides three categories of services: telephone HOTLINE assistance (919/541-0800), direct engineering assistance, and technical guidance. The HOTLINE permits easy access for state and local agencies to EPA personnel who can provide prompt assistance in a variety of ways, including consultations, references to pertinent literature, and access to EPA technical data and analyses. Direct engineering assistance is short-term, averaging about 3 months and providing technical assistance without regard to national utility. Technical guidance is longer term, up to a year, broader in scope, and with national applications.

Keywords: *Air pollution, *Technology transfer, *Information services, Technical assistance, Assistance, US EPA, Pollution sources, Toxic substances, Particles, Forecasting, Volatile organic compounds, Carbon monoxide, Information transfer, Guidelines, Environmental engineering, Sulfur oxides, Nitrogen oxides, *Control Technology Center.

PB91-222042/REB PC **A10**/MF **A03**
Guidance Document for Selecting Antiskid Materials Applied to Ice- and Snow-Covered Roadways. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Jul 91, 222p EPA/450/3-90/007A
See also PB90-183658.Portions of this document are not fully legible.

The report describes a study whose primary purpose was to provide guidance on methods to determine: (1)

the physical properties and durability of antiskid material selected for use on ice and snow-covered roadways; and (2) criteria for defining the elements of an effective emission control strategy associated with the use of antskid materials. The report is expected to be used by local, State, and regional air pollution control agencies to identify antiskid materials that are both durable and effective and produce fewer emissions. Phase I of the study collected background information to derive preliminary selection criteria for antiskid materials based on existing data. Phase 2 was a laboratory evaluation to: (1) determine the physical properties of typical antiskid materials and (2) conduct suitable tests of antiskid materials to determine their potential for the generation of emissions. Based on limited data, the class of materials that is relatively hard as indicated by low silt content, low abrasion loss and high values for the Vickers hardness test, had the lowest overall potential for silt generation. The best overall indicator of silt generation potential appeared to be the Los Angeles abrasion loss.

Keywords: *Antiskid materials, *Pavement skid resistance, *Air pollution, *Ice removal, Antiskid coatings, Emission, Skid control, Road materials, Highway maintenance, Snow removal, Street maintenance.

PB91-222059/REB PC **A06**/MF **A02**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Air/Superfund National Technical Guidance Study Series. Database of Emission Rate Measurement Projects. Technical note.
Radian Corp., Austin, TX.
B. Eklund, C. Petrinec, D. Ranum, and L. Howlett. Jun 91, 119p RCN-258-040-27-03, EPA/450/1-91/003
Contract EPA-68-02-4392
Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

A compilation and evaluation of Volatile Organic Compound (VOC) emission rate data was performed. The three primary objectives were (1) to determine typical averages and ranges of emissions for various types of sources; (2) to determine the degree of correlation between emission rate results from different sampling methods; and (30 to examine the effects of different variables on measured emission rates. Emission rate data are presented for 33 studies covering 13 types of emission sources. The sources include landfills, surface impoundments, waste water treatment systems, leaking underground storage tanks, soil piles and landfarms. The emission rate data were obtained by using the Emission Isolation Flux Chamber, Downhole Emissions Isolation Flux Chamber, the Concentration Profile method and the Transect method. For each source, the total non-methane hydrocarbon and benzene emission rates are reported along with three other compounds that had the highest emission rate. Source concentration data (e.g. concentration in soil or waste water) are also reported for comparison to the measured emission rates.

Keywords: *Superfund, *Air pollution sampling, *Emission factors, *Waste disposal, *Sewage treatment, *Land pollution, Information systems, Pollution sources, Concentration(Composition), Volatile organic compounds, Soil contamination, Comparison, Baseline measurements, Benzene, Soil gases, Storage tanks, Earth fills, Surface impoundments, Tables(Data), Non-methane hydrocarbons, Emission inventories.

PB91-222505/REB PC **A11**/MF **A03**
Radiation and Mixed Waste Incineration. Background Information Document. Volume 1. Technology. Final rept.
Office of Radiation Programs, Washington, DC.
M. Nawar. May 91, 236p EPA/520/1-91/010-1

The report provides a broad look at technology issues surrounding the incineration of radioactive and mixed wastes. It is intended to high light major considerations and to provide direction that would enable the reader who must deal in depth with incineration to focus on and seek specific information on concerns appropriate to a particular situation. It is not a comprehensive text on incinerator design, use, or regulation.

Keywords: *Incinerators, *Radioactive waste disposal, *Air pollution control, *Air pollution abatement, Hazardous materials, Mixtures, Design criteria, Performance standards, Pollution regulations, Information transfer, Operations, Air pollution monitoring.

PB91-222513/REB PC **A06**/MF **A02**
Radiation and Mixed Waste Incineration: Background Information Document. Volume 2. Risk of Radiation Exposure. Final rept.
Office of Radiation Programs, Washington, DC.
May 91, 119p EPA/520/1-91/010-2

The report provides background information describing the major public health issues and current regulatory structure associated with radioactive materials. It has an appendixes which provide formal definitions of key radiation protection terms and additional descriptive information on the types of radiation and their effects, along with the references cited in the text, a comprehensive bibliography is also provided.

Keywords: *Radioactive waste disposal, *Air pollution effects(Humans), *Public health, *Incineration, *Risk assessment, Exposure, Hazardous materials, Mixtures, Radiation effects, Pollution regulations, Standards compliance.

PB91-222521/REB PC **A15**/MF **A03**
Ocean Current Measurements at the Farallon Islands Low-Level Radioactive Waste Disposal Site, 1977-1978. Includes Appendix. Final rept.
Office of Radiation Programs, Washington, DC.
Jun 91, 340p EPA/520/1-91/009, EPA/520/1-91/009A

The report discusses the results of ocean bottom current measurements obtain from the Farallon Islands Low-Level Waste Disposal Site off the California coast, near San Francisco. The report includes a discussion of the velocity of the currents over the time period and area measured relative to large-scale currents off the California coast, and the possibility for shoreward transport of LLW Materials from the Farallon Islands Site.

Keywords: *Ocean currents, *Farallon Islands, *Radioactive waste disposal, *Low-level radioactive wastes, *Environmental transport, *Ocean waste disposal, Coastal regions, Sediments, California, Current meters, Data processing, Ocean bottom, Comparison, Water pollution sources.

PB91-222539/REB PC **A10**/MF **A03**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Air Pollutant Emission Standards and Guidelines for Municipal Waste Combustors: Economic Analysis of Materials Separation Requirement. Final rept.
Research Triangle Inst., Research Triangle Park, NC. Center for Economics Research.
B. J. Morton, C. D. Ellestad, D. C. Byrd, D. W. Anderson, and C. C. Chapman. Nov 90, 224p EPA/450/3-91/002
Contract EPA-68-D8-0073
See also PB91-168575. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The new source performance standards and emission guidelines for municipal waste combustors mandate separation of 25 percent of municipal solid waste prior to combustion. The study investigates the residential recycling programs that communities of different populations and population densities may operate to comply with the requirement. The study predicts that two-stream and multiple-stream recycling programs, along with centralized composting, will be most frequent. The probability that a community will operate a certain program depends on the type of community and type of program. The study also predicts the relationships among the type of program, the type of community, and the diversion rates. The study calculates the total diversion of each separated material, the change in prices of these materials, the cost of each recycling program, and the national cost of the separation requirement. Cost-savings from planned combustor downsizing, avoided landfilling, and avoided garbage collection were also calculated. The estimate of net cost includes annualized capital, operations, and maintenance costs, cost-savings, and revenues.

Keywords: *Air pollution standards, *Municipal wastes, *Incineration, *Waste disposal, *Air pollution abatement, *Materials recovery, *Economic analysis, New Source Performance Standards, Separation, Waste recycling, Solid waste management, Cost analysis, Standards compliance, Household wastes, Collection systems, Guidelines, Requirements, Air pollution economics, Substitutes.

PB91-223131/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Source Sampling and Analysis Guidance: A Methods Directory.
Southern Research Inst., Birmingham, AL.
M. D. Jackson, L. D. Johnson, K. W. Baughman, R. H. James, and R. B. Spafford. 1991, 10p EPA/600/D-91/143
Contract EPA-68-02-4442
Presented at the Annual Waste Testing and Quality Assurance Symposium (7th), Washington, DC., July 8-12, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Sampling and analytical methodologies are needed by EPA and industry for testing stationary sources for specific organic compounds such as those listed under the Resource Conservation and Recovery Act (RCRA) Appendix VIII and Appendix IX and the Clean Air Act of 1990. A computerized directory, Problem POHC Reference Directory, has been developed that supplies information on available field sampling and analytical methodology for each compound in those lists. Existing EPA methods are referenced if applicable, along with their validation status. At the present, the data base is strongly oriented toward combustion sources. The base may be searched on the basis of several parameters including name, Chemical Abstracts Service (CAS) number, physical properties, thermal stability, combustion rank, or general problem areas in sampling or analysis. The methods directory is menu driven and requires no programming ability; however, some familiarity with dBASE III + would be helpful.

Keywords: *Air pollution sampling, *Air pollution detection, *Directories, Data bases, Guidelines, Field tests, Concentration(Composition), Combustion, Physical properties, Thermal stability, Gas analysis, Chemical analysis, *Principal Organic Hazardous Constituents, *Stationary sources, *Problem POHC Reference Directory data base, CAS Registry Number.

PB91-223149/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Anthropogenic Emissions Involved in Acidic Deposition Processes.
Pechan (E.H.) and Associates, Inc., Durham, NC.
R. E. Battye. 1991, 18p EPA/600/D-91/144
Contract EPA-68-D9-0168
Presented at the Air and Waste Management Association Annual Meeting (83rd), Pittsburgh, PA., June 24-29, 1990. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper describes the methodology that was used to develop the 1985 National Acid Precipitation Assessment Program (NAPAP) Emissions Inventory, including quality control procedures, and summarizes the inventory contents. Development of the 1985 inventory required detailed investigation of millions of sources of air pollution. Data gathered for the inventory include activity levels (e.g., fuel consumed in a boiler, tons of product produced at a manufacturing plant, and miles traveled for transportation sources), emission estimates, and, for point sources, physical parameters (such as stack height) that affect the atmospheric transport of emissions. The inventory was produced in two formats, an annual data base and a modelers' inventory. The annual data base fulfills the requirements of the NAPAP assessment activities and provides a baseline inventory for the emission projection models, while the modelers' inventory was developed for use as input to atmospheric models. The 1985 inventory provided a considerable amount of data useful for characterizing emissions sources. The inventory indicated that, in 1985, over 75% of U.S. SO2 emissions originated from large plants (mostly electric utility plants) that emitted at least 10 Gc(10,000 tons) annually. In comparison, only 27% of national NOx and 1% of national VOC emissions came from such large plants.

Keywords: *Deposition, *Air pollution sampling, *Acidification, Acid rain, Precipitation(Meteorology), Pollution sources, Atmospheric diffusion, Exhaust emissions, Industrial wastes, Combustion products, Mobile pollutant sources, Stationary sources, Concentration(Composition), Quality control, *Emission inventories, *National Acid Precipitation Assessment Program.

PB91-223156/REB PC **A03**/MF **A01**
Advancing Woodstove Secondary Combustion State-of-the-Art.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
R. C. McCrillis, and N. L. Butts. 1991, 14p EPA/600/D-91/145
Presented at the Annual Meeting, Air and Waste Management Association (84th), Vancouver, B.C., June 16-21, 1991.

The paper summarizes work performed by EPA/AEERL at its in-house woodstove test laboratory over the past several years, including investigations into the effects of augmenting the secondary combustion process with electric glowplugs and extensive tests on two EPA 1990 certified stoves, directed at achieving lower emissions by retuning the primary and secondary air controls. Most emission tests have been done while burning split oak cordwood. The work, termed noncatalytic technology, involves maintaining gas temperatures above the ignition point even at low burnrates without using a catalyst, by restricting heat transfer in an insulated secondary combustion chamber, and by providing adequate fresh preheated air to the secondary combustion zone. This represents one of two basic approaches to reducing emissions from residential woodstoves by enhancing the secondary combustion process. All cordwood-burning woodstoves operate in an air-starved mode which promotes the generation of products of incomplete combustion (PICs), including CO and a wide range of organic compounds. The heavier molecular weight organics condense into a fine aerosol upon entering the atmosphere, producing visible smoke. A large percent of these PICs must be oxidized to CO2 and water by enhancing the combustion process outside of the primary combustion zone.

Keywords: *Wood, *Stoves, *Smoke, *Air pollution control, Indoor air pollution, Aerosols, Carbon monoxide, Carbon dioxide, Stationary sources, Igniters, Organic compounds, Technology assessment, Combustion products, Glowplugs, Secondary combustion.

PB91-223164/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Natural Gas Reburning for NOx Control on a Cyclone-Fired Boiler.
ABB Combustion Engineering, Windsor, CT.
R. E. Hall, R. W. Borio, R. D. Lewis, and R. Booth.
1991, 18p EPA/600/D-91/146
Contract EPA-68-02-4280
Presented at the Annual Meeting and Exhibition, Air and Waste Management Association (84th) Vancouver, B.C. (Canada), June 16-21, 1991. Prepared in cooperation with Energy Systems Associates, Pittsburgh, PA. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses natural gas reburning (fuel staging) for nitrogen oxide (NOx) control on a cyclone-fired boiler. Reburning is an in-furnace NOx combustion modification technology that has been shown to reduce NOx by 50-60%. Reburning is accomplished by injecting fuel downstream of the primary combustion zone, creating a reducing zone in which NOx formed in the primary zone reacts with hydrocarbon radicals to form molecular nitrogen and water vapor. Burnout air is added downstream of the reburn zone to complete the combustion process at a lower temperature. Bench- and pilot-scale tests in the 1980s provided results on the importance of stoichiometry in the reburn zone, residence time, and the fuel nitrogen content of the reburn fuel. To apply reburn technology to a full-scale boiler, a reburn demonstration has been initiated on a 108 MWe cyclone-fired boiler at Ohio Edison's Niles Station. A cyclone boiler was selected because it is an inherently high NOx emitter and most low NOx combustion modification technologies are not applicable to cyclone and other wet-bottom boilers. Parametric tests have shown that NOx can be reduced by 50-60% with acceptable boiler operation by injecting natural gas into the reburn zone to account for 15-18% (fuel equivalent) of the boiler's heat load.

Keywords: *Nitrogen oxides, *Natural gas, *Boilers, *Air pollution control, *Combustion, Furnaces, Stationary sources, Field tests, Laboratory tests, Technology assessment, Combustion chemistry, *Reburning, *Fuel staging.

PB91-223172/REB PC **A03**/MF **A01**
Comparability between Various Field and Laboratory Woodstove Emission Measurement Methods.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
R. C. McCrillis, and D. R. Jaasma. 1991, 16p EPA/600/D-91/147
Presented at the Annual Meeting, Air and Waste Management Association (84th), Vancouver, B.C., June 16-21, 1991. Prepared in cooperation with Virginia Polytechnic Inst. and State Univ., Blacksburg.

The paper compares various field and laboratory woodstove emission measurement methods. In 1988, the U.S. EPA promulgated performance standards for residential wood heaters (woodstoves). Over the past several years, a number of field studies have been undertaken to determine the actual level of emission reduction achieved by new technology woodstoves in everyday use. The studies have required the development and use of particulate and gaseous emission sampling equipment compatible with operation in private homes. Since woodstoves are tested for certification in the laboratory using EPA Methods 5G and 5H, it is of interest to determine the correlation between these regulatory methods and the inhouse equipment. Two inhouse sampling systems have been used most widely: one is an intermittent, pump-driven particulate sampler that collects particulate and condensible organics on a filter and organic adsorbent resin; and the other uses an evacuated cylinder as the motive force and particulate and condensible organics are collected in a condenser and dual filter. Both samplers can operate unattended for 1-week periods. A large number of tests have been run comparing Methods 5G and 5H to both samplers. The paper presents these comparison data and determines the relationships between regulations and field samplers.

Keywords: *Wood burning appliances, *Air pollution sampling, Field tests, Experimental design, Stoves, Residential buildings, Space heating, Air pollution abatement, Pollution regulations, Samplers, Performance evaluation, Concentration(Composition).

PB91-223180/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Handbook on Control Technologies for Hazardous Air Pollutants: HAP Manual.
Pacific Environmental Services, Inc., Durham, NC.
M. K. Sink, C. M. Nunez, and J. A. Manning. 9 Jan 90, 21p EPA/600/D-91/148
Contract EPA-68-C8-0011
Presented at the Annual Meeting, Air and Waste Management Association (84th), Vancouver, B.C., June 16-21, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper is based on an examination of engineering design and study type (+ or - 30%) cost estimation procedures for 10 add-on control techniques for hazardous air pollutants (HAPs). The examination updated and revised the first edition of the EPA's HAP manual to reflect advances in point source control techniques and provide recent capital and annual cost data for each point source control technique. The HAP manual is designed to assist permit reviewers by providing basic engineering and cost equations for common gaseous and particulate control techniques. These equations enable the user to obtain approximate design values and capital and annual costs of the proposed equipment, which can then be compared to the permit applicant's values.

Keywords: *Air pollution control, *Hazardous materials, *Manuals, Technology utilization, Cost analysis, Design criteria, Capitalized costs, Permits, Revisions, Point sources, Cost estimates, Performance standards, *Hazardous air pollutant prioritization system.

PB91-223198/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Hazardous Air Pollutants Program (HAP-PRO): Automated HAP and VOC Control Technology Assessment Software. Rept. for Jan-Sep 90.
Pacific Environmental Services, Inc., Durham, NC.
S. L. Moore, and C. M. Nunez. 1991, 18p EPA/600/D-91/149
Contract EPA-68-C8-0011
Presented at the Air and Waste Management Association Annual Meeting (84th), Vancouver, B.C., June 16-21, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses the Hazardous Air Pollutant Program (HAP-PRO), version 1.0, automated hazardous air pollutant (HAP) and volatile organic compound (VOC) control technology assessment software, designed to assist permit engineers in reviewing applications for control of air toxics. The program is used to calculate the capital and annual costs of implementing six different VOC and three different particulate control devices, including selected engineering parameters, which may be used to help review the engineering design values. HAP-PRO functions as an 'expert system.' Users with limited knowledge of design calculations and costing methodologies can determine the approximate costs of implementing a control device. The tedious and complex calculations are performed for the user. A secondary purpose of HAP-PRO is to generate lists of all facilities containing (1) a specific pollutant in their emission stream(s), or (2) a specific type of emission stream (organic or inorganic vapor and particulate). With such reports, the user can quickly determine which sources are emitting a given pollutant if further investigation is warranted. HAP-PRO also performs the role of a traditional data base management system (DBMS) by allowing queries to be performed of its data base.

Keywords: *Air pollution control, *Hazardous materials, *Volatile organic compounds, *Toxic substances, *Computerized simulation, *Expert systems, Technology utilization, Cost analysis, Permits, Design criteria, Performance standards, Pollution sources, Data base management, Information transfer, Air pollution control equipment, *Hazardous air pollutant prioritization system.

PB91-223206/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Air Toxic Emissions from Iron Foundries.
Pechan (E.H.) and Associates, Inc., Durham, NC.
G. Gschwandtner, S. Fairchild, and R. C. McCrillis.
1991, 13p EPA/600/D-91/150
Contract EPA-68-D9-0168
Presented at the Annual Meeting, Air and Waste Management Association (84th), Vancouver, B.C., June 16-21, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper presents uncontrolled air toxic emission factors for different process operations in a gray iron foundry. The emission factors are based on the results of on-site test measurements available in the literature. The emission factors are presented for organic and inorganic compounds emitted from cupolas, electric are furnaces, electric induction furnaces, inoculation, casting, sand shakeout, and core making. Because the number of test measurements reported in the literature is severely limited, the factors should be used with caution.

Keywords: *Air pollution sampling, *Emission factors, *Iron and steel industry, *Foundries, *Toxic substances, Concentration(Composition), Furnaces, Combustion products, Casting, On-site investigations, Field tests, Tables(Data).

PB91-223214/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Method for Estimating Methane Emissions from Underground Coal Mines: Preliminary Findings.
Alliance Technologies Corp., Chapel Hill, NC.
J. W. Jones, D. A. Kirchgessner, S. D. Piccot, J. D. Winkler, and P. J. Marsosudiro. 4 Sep 90, 18p EPA/600/D-91/151
Contract EPA-68-D9-0173

Presented at the Annual Meeting, AWMA (84th) held in Vancouver, B.C. on June 16-21, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses the development of an improved method for estimating global methane (CH4) emissions from underground coal mining. Since emissions data are presently not available for surface mines, this method is currently restricted to underground mines. The EPA has embarked on a measurements program to quantify CH4 emissions from selected surface mines in the U.S. for later inclusion in this work. CH4 from underground mines can be liberated from three sources: ventilation shafts, gob wells, and crushing operations. Ventilation air, although generally containing 1% or less CH4, contributes most mine emissions because of the enormous volume of air used to ventilate the mine. Gob wells are drilled into the rubble-filled areas formed when the mine roof subsides into the unsupported cavity left behind by longwall mining. Their purpose is to remove CH4 which would otherwise have to be removed by larger and more costly ventilation systems. Currently, no published data exist for the release of CH4 from gob wells. However, preliminary data from the coal mining industry indicate that gob well CH4 emissions could account for a significant fraction of the total emissions associated with longwall mines. The method described in the paper integrates data on coal production, coal properties, coalbed CH4 contents, and coal mine ventilation air emissions from U.S. mines.

Keywords: *Methane, *Underground mining, *Coal mining, *Air pollution sampling, *Emission factors, *Mathematical models, Study estimates, Concentration(Composition), Ventilation, Global aspects, Crushing, Data processing, Regression analysis, Physical properties, Chemical properties, Gob wells.

PB91-223222/REB PC A03/MF A01
Comparison of Emissions and Organic Fingerprints from Combustion of Oil and Wood.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
R. S. Steiber, and R. C. McCrillis. 1991, 13p EPA/600/D-91/152

The paper presents data from an Integrated Air Cancer Project (IACP) pilot study on the total carbon, organics, and particulate emissions from oil furnaces with both gun-type and retention head burners. The data are compared to results of a similar IACP study on woodstoves conducted in Boise, Idaho, in the winter of 1986-87. The comparison shows that woodstoves produce a richer stew of organic materials and particulates, but that oil furnaces emit more soot. In addition, the chemical structures of wood and oil are discussed, and GC/MS data are presented showing how these structures result in a characteristic fingerprint when these fuels are burned.

Keywords: *Air pollution sampling, *Wood burning appliances, *Oil furnaces, *Combustion products, *Identification systems, Molecular structure, Stoves, Chemical properties, Space heating, Comparison, Residential buildings, Particles, Concentration(Composition), Combustion efficiency, Soot, Performance evaluation, Organic compounds, *Emission inventories, Integrated Air Cancer Project.

PB91-223230/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
EPA's Global Climate Change Program: Global Landfill Methane.
Radian Corp., Research Triangle Park, NC.
S. A. Thorneloe, and R. L. Peer. Jun 91, 24p EPA/600/D-91/153
Contract EPA-68-D9-0054
See also PB91-182667. Presented at the Annual Meeting, Air and Waste Management Association (84th), Vancouver, B.C., June 16-21, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses AEERL's research efforts on global landfill methane (CH4). CH4 is of particular concern because its radiative forcing potential is thought to be much greater than that of carbon dioxide. Although the major sources of CH4 are known qualitatively, considerable uncertainty exists about the quantitative emissions from each source. One goal of AEERL's global climate research program is to develop a more accurate inventory of CH4 emissions from landfills. For major sources of greenhouse gases, AEERL has a program to develop and demonstrate mitigation/control opportunities for sources that are amenable to cost-effective control. The paper describes how global landfill CH4 is being estimated and what work has been initiated relating to the mitigation of global landfill CH4.

Keywords: *Climatic changes, *Methane, *Earth fills, *Waste disposal, *Air pollution sampling, Concentration(Composition), Air pollution control, Global warming, Greenhouse effect, Tables(Data), Graphs(Charts), Pollution sources, Environmental transport, Energy source development, Cost effectiveness, *Emission inventories.

PB91-223248/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Transient Suppression Packaging for Reduced Emissions from Rotary Kiln Incinerators. Journal article.
Arizona Univ., Tucson. Dept. of Chemical Engineering.
P. M. Lemieux, W. P. Linak, J. A. McSorley, and J. O. L. Wendt. 1991, 14p EPA/600/D-91/154
Contract EPA-68-02-4701
Presented at the International Congress on Toxic Combustion By-Products: Formation and Control (2nd), Salt Lake City, UT. in March, 1991. Prepared in cooperation with Acurex Corp., Research Triangle Park, NC. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses experiments, on a 73 kW roray kiln incinerator simulator, to determine the effect of innovative waste packaging designs on transient emissions of products of incomplete combustion (PICs) due to batch-charging of containerized liquid surrogate waste compounds bound on ground corncob sorbent. When containers of waste are batch-charged into rotary kilns, the rupture of the containers as often followed by a very rapid evolution of the volatile compounds contained therein. This flash vaporization/pyrolysis can result in local depletion of available O2, as supplied from the primary burner. This can lead to a transient puff of partially combusted organic material that can pass through the primary combustion chamber and, possibly, even through the secondary combustion chamber and/or downstream pollution control equipment. This phenomenon frequently leads to feed rate limitations based on the volatility or heat of combustion of organic liquids inside the containers. EPA's AEERL has developed a prototype container system designed to partition the waste/sorbent mixture within the containers that are fed into the rotary kiln. By compartmentalizing the waste, the release of volatile compounds is delayed over a longer time than when charging single-chambered containers. Thus, the local depletion of O2 occurs to a lesser degree, resulting in an overall smaller transient puff.

Keywords: *Air pollution control, *Combustion efficiency, *Hazardous materials, *Waste disposal, *Containers, *Incinerators, Design criteria, Liquid waste disposal, Packaging, Solid waste disposal, Volatile organic compounds, Experimental design, Performance evaluation, Kilns, Reprints, Principal organic hazardous constituents, Puffs.

PB91-223255/REB PC A02/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Small-Chamber Determinations of the Emission Rates of Mercury from Latex Paints.
Acurex Corp., Research Triangle Park, NC.
B. A. Tichenor, and Z. Guo. 1991, 9p EPA/600/D-91/155
Contract EPA-68-D0-0141
Presented at the Annual Meeting, AWMA (84th) held in Vancouver, B.C. on June 16-21, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results of testing five latex paints, containing organic mercury additives, in small environmental test chambers to determine the emission rates of mercury. Two of the paints contained phenyl mercuric acetate (PMA); the other three contained different additives. Gypsum wallboard was used as the test substrate. Testing was conducted in the dark and under fluorescent lights to determine if photodegradation of the mercury was occurring. Chamber vapor samples were collected on hopcalite sorbent and analyzed by cold-vapor atomic absorption spectroscopy (AAS) to determine total mercury. Sampling with graphitized carbon sorbeents showed that no organic mercury was emitted. A nth order source emission model was used to fit the chamber mercury concentration vs. time data. The results of the study showed high initial emission rates followed by slow emissions over an extended period of time. There was no apparent effect of light. The type of additive may affect the emission rates.

Keywords: *Air pollution sampling, *Mercury(Metal), *Indoor air pollution, *Emission factors, *Latex, Paints, Test chambers, Pollution regulations, Air pollution abatement, Additives, Concentration(Composition).

PB91-223263/REB PC A03/MF A01
Initial Verification of the Environmental Protection Agency Indoor Air Quality Model EXPOSURE Version 2. Rept. for Jan 89-Dec 90.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
L. E. Sparks, B. A. Tichenor, J. B. White, J. Chang, and M. D. Jackson. 1991, 15p EPA/600/D-91/156

The paper describes experiments to verify an indoor air quality (IAQ) model, EXPOSURE, that includes the interactions of sources, sinks, and air movement between rooms and between buildings and the outdoors. Sources may be located in rooms, in the heating, ventilation, and air-conditioning (HVAC) system, or outdoors. There may be sinks (i.e., materials that adsorb indoor pollutants) in the same locations. Sinks may also act as sources when pollutant concentrations drop below a given value. The model EXPOSURE, described in the paper, is based on the model INDOOR. Major differences between EXPOSURE and INDOOR are an improved user interface, a faster solution technique, and the ability to predict individual exposure. EXPOSURE also incorporates the results of recent research on sources and sinks. Combining chamber studies, test house studies, and modeling has been quite valuable. The chamber tests allow many factors to be investigated rapidly. The model allows coupling chamber data to the test house. And test house studies provide model verification, identification of weakness in the model, and the chamber data that require additional chamber testing, theoretical analysis, and test house experiments.

Keywords: *Indoor air pollution, *Mathematical models, *Air quality display models, *Air pollution effects(Humans), Emission factors, Test chambers, Performance evaluation, Air pollution, Air flow, Environmental engineering, Comparison, Construction materials, Buildings, Exposure, Public health, Aerosols, US EPA, Pollution sources, *EXPOSURE Model, INDOOR Model.

PB91-223271/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Proceedings of Two Highway Vehicle Emissions Workshops.
Pechan (E.H.) and Associates, Inc., Durham, NC.
J. H. Wilson, and C. T. Ripberger. 1991, 21p EPA/600/D-91/157
Contract EPA-68-D9-0168
See also PB91-168492. Presented at the Annual Meeting, Air and Waste Management Association (84th), Vancouver, B.C., June 17-21, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results of two workshops held by the U.S. EPA (7/19-20/90 and 8/12/90 in Washington, DC, and Sacramento, CA, respectively) to solicit research ideas from outside the Agency on research opportunities to improve the state of the art in estimating highway vehicle emissions. EPA's Joint Emission Inventory Oversight Group is initiating research projects with a goal of better quantifying air pollutant emissions in both current and future years. Highway vehicles have been found to be important contributors to organic, oxides of nitrogen, and carbon monoxide emissions as well as some hazardous air pollutants, despite the significant emission reductions that have already been achieved on a per-vehicle basis.

Keywords: *Meetings, *Exhaust emissions, *Air pollution sampling, *Air pollution abatement, *Emission factors, *Mathematical models, Study estimates, Forecasting, Highways, Mobile pollutant sources, Concentration(Composition), Air pollution control, Performance standards, Air pollution standards, Alternative fuels, Automobile exhaust, Source reduction.

PB91-223289/REB PC **A03**/MF **A01**
Application of Pulse Combustion to Solid and Hazardous Waste Incineration.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
C. R. Stewart, P. M. Lemieux, and B. T. Zinn. 1991, 25p EPA/600/D-91/158
Presented at the International Symposium on Pulsating Combustion, Monterey, CA., August 6-8, 1991. Prepared in cooperation with Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.

The paper discusses the application of pulse combustion to solid and hazardous waste incineration. A rotary kiln incinerator simulator was retrofitted with a frequency-tunable pulse combustor to enhance the efficiency of combustion. The pulse combustor excites pulsations in the kiln and increases the completeness of combustion by promoting better mixing within the system. Tests were performed using toluene sorbed onto a ground corn cob sorbent and placed in cardboard containers. The burner was operated in a non-pulse mode as a baseline condition, and then in a pulse mode in which the frequency of the pulse combustor was adjusted to the natural frequency of the combustion chamber, creating resonant pulsations of large magnitude. The test was also performed using polyethylene tube bundles to simulate a solid waste and to investigate a surrogate which produces different puff characteristics. The addition of turbulence in the rotary kiln due to high amplitude acoustic pulsations has a strong tendency to reduce the amount of soot and/or semivolatile and non-volatile hydrocarbons. Mass emissions of soot were consistently reduced in all tests. Carbon monoxide increased during acoustic pulsations in the toluene tests. The paper also discusses unsatisfied oxygen demand and carbon penetration and how pulsations affect them.

Keywords: *Incinerators, *Air pollution control, *Waste disposal, *Combustion efficiency, Solid wastes, Hazardous materials, Combusting chambers, Performance evaluation, Kilns, Burners, Soot, Carbon monoxide, *Pulse combustion, Puffs.

PB91-223297/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Thermodynamic Evaluation of Five Alternative Refrigerants in Vapour-Compression Cycles.
Acurex Corp., Research Triangle Park, NC.
G. S. Kazachki, and C. L. Gage. 1991, 12p EPA/600/D-91/159
Contract EPA-68-D0-0141
Presented at the International Congress of Refrigeration (18th), Montreal (Canada), August 10-16, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results of a thermodynamic evaluation of five alternative refrigerants in a vapor-compression refrigeration cycle, utilizing throttling, superheating, and combined throttling and superheating. Five alternative refrigerants (R32, R125, R134a, R143a, and R152a) were considered for refrigerants R12, R22, and R502. Thermodynamically, the best alternative for R12 in a wide range of evaporation and condensing temperatures is R152a, which should be applied in a cycle without internal heat exchange. The second alternative is R134a, which should be applied in a cycle with internal heat exchange. Between R143a and R125, both of which should be applied in a cycle with internal heat exchange, the better replacement thermodynamically for R502 is R143a, particularly at high condensing temperatures. At low condensing temperatures, R125 is to be considered, especially if extended internal heat exchange is applied. As a replacement for R502, R32 has good performance and much higher volumetric capacity. However, excessively high discharge temperatures contraindicate its use, particularly with hermetic and semi-hermetic compressors. No internal heat exchange should be applied with R32, and extreme care should be taken to prevent superheating in suction lines.

Keywords: *Refrigerants, *Substitutes, *Heat transfer, *Thermodynamics, *Vapor compression refrigeration cycle, Pollution, Air pollution control, Stationary sources.

PB91-223305/REB PC **A02**/MF **A01**
Inactivation of 'Giardia lamblia' by Free Chlorine: A Mathematical Model.
Environmental Protection Agency, Cincinnati, OH. Drinking Water Research Div.
R. M. Clark, S. Regli, and D. A. Black. c1991, 10p EPA/600/D-91/160
See also PB89-233472. Presented at the American Water Works Association Water Quality Technology Conference, St. Louis, MO., November 13-17, 1988. Prepared in cooperation with Nevada Univ., Las Vegas.

EPA's Office of Drinking Water is interested in using the C.t concept for providing guidance as to adequate disinfection for inactivating Giardia cysts. Using both animal infectivity and excystation data a model has been developed for predicting C.t values. The model is then incorporated into a regulatory strategy that may be used for specifying C.t values for EPA's Surface Water Treatment Rule.

Keywords: *Potable water, *Water microbiology, *Giardia lamblia, *Water treatment, *Chlorine, Virulence, Animal disease models, Disease outbreaks, Mathematical models, Reprints, Safe Drinking Water Act.

PB91-223313/REB PC **A03**/MF **A01**
Development, Application, and Calibration of Models for Predicting Water Quality in Distribution Systems.
Environmental Protection Agency, Cincinnati, OH. Drinking Water Research Div.
R. M. Clark, J. A. Coyle, W. M. Grayman, and R. M. Males. c1988, 23p EPA/600/D-91/161
Presented at the American Water Works Association Water Quality Technology Conference, St. Louis, MO., November 13-17, 1988. Prepared in cooperation with North Penn Water Authority, Lansdale, PA., Grayman (Walter M.), Concinnati, OH., and RMM Technical Services, Inc., Cincinnati, OH.

Although the Safe Drinking Act and its amendments (SDWAA) has been interpreted as meaning that MCLs shall be met at the consumer's tap, most regulatory concern has been focused on water as it leaves the treatment plant before entering the distribution system. The only SDWAA regulation that emphasize system sampling are the trihalomethane and monitoring regulations. The paper provides the results of a study conducted in cooperation with the North Penn Water Authority in Lansdale, PA that resulted in development of a series of models for predicting the spatial distribution of contaminants in the distribution system. The study concluded that hydraulic modeling coupled with extensive field verification is required to develop usable predictive models.

Keywords: *Water quality, *Distribution systems, *Water pollution standards, *Potable water, *Mathematical models, Calibrating, Pollution regulations, Halomethanes, Hydraulics, Dynamic programming, Standards compliance, Environmental engineering, Environmental transport, Water supply, Graphs(Charts), Reprints, *Maximum Contaminant Level Goals, Safe Drinking Water Act.

PB91-223321/REB PC **A03**/MF **A01**
EPA's Research Program in Granular Activated Carbon.
Environmental Protection Agency, Cincinnati, OH. Drinking Water Research Div.
R. M. Clark, T. F. Speth, and B. W. Lykins. c1989, 21p EPA/600/D-91/162
Presented at the AWWARE Conference on Design and Use of GAC Practical Aspects, Cincinnati, OH., May 9-10, 1989.

Research into Granular Activated Carbon (GAC) for use in drinking water treatment has a long history in the Drinking Water Research Division and its predecessor organizations. Studies were conducted by the U.S. Public Health Service in the late fifties and early sixties to examine the use of GAC. Passage of the Safe Drinking Water Act Amendments of 1986 has identified GAC to be a baseline technology against which all other technologies must be measured for the removal of SOCs from drinking water. The various aspects of the USEPA's Drinking Water Research Division's GAC research program are discussed. First the bench and pilot scale studies devoted to the application of GAC will be presented. The results from field scale studies and the possible use of GAC for disinfection by-products precursor removal will be discussed. Isotherms have been discovered to be a very useful tool for preliminary design of GAC systems. Modeling techniques verified by field studies has proven to be very useful in predicting the full performance of GAC systems.

Keywords: *Granular activated carbon treatment, *Water treatment, *Research and development, *Potable water, US EPA, Pollution regulations, Performance evaluation, Mathematical models, Forecasting, Disinfection, Baseline measurements, Byproducts, Organic compounds, Reprints, Maximum Contaminant Level Goals, Safe Drinking Water Act.

PB91-223339/REB PC **A02**/MF **A01**
Determination of C-t Values.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
G. F. Craun. c1991, 10p EPA/600/D-91/163
Pub. in Proceedings of the ASDWA/EPA Workshop on Methods for the Investigation and Prevention of Waterborne Disease Outbreaks (held in Denver, CO. on October 10-13, 1988) p193-205.

The 1986 Amendments to the Safe Drinking Water Act (SDWA) require EPA to promulgate primary Drinking Water Regulations (1) specifying criteria under which filtration would be required, (2) requiring disinfection as a treatment technique for all public water systems, and (3) establishing maximum contaminant levels (MCLs) or treatment requirements for control of Giardia lamblia viruses, Legionella, hetertrophic plate count, bacteria, and turbidity. Giardia lamblia is one of the most resistant organisms to disinfection by chlorine found in water and therefore the Surface Water Treatment Rule specifies 'C.t' (the product of Concentration of disinfectant in mg/L and disinfectant contact time in minutes) for 99.9 percent inactivation of Giardia cysts. Many factors influence Giardia lamblia reaction kinetics including temperature, pH, chlorine concentration and inactivation level. The paper develops a model to describe these interactions and to predict C.t values based on specific model inputs. A strategy is proposed that uses the model to provide conservative C.t values for regulatory purposes.

Keywords: *Water treatment, *Potable water, *Disinfection, *Mathematical models, Pollution regulations, Water supply, Aquatic microorganisms, Chlorination, Temperature, pH, Reaction kinetics, Reprints, *Chemical treatment, Maximum Contaminant Level Goals, Safe Drinking Water Act, Giardia lamblia.

PB91-223347/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Observations on Waste Destruction in Liquid Injection Incinerators (Revised). Journal article.
Energy and Environmental Research Corp., Irvine, CA.
J. C. Kramlich. c1990, 16p EPA/600/J-90/534
Contract EPA-68-02-3633
Pub. in Combustion Science and Technology, v74 p17-30 1990. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses various factors affecting the performance of a subscale liquid injection incinerator simulator. The mechanisms by which waste escapes incineration within the spray flame are investigated for variations in atomization quality, flame stoichiometry, and the initial waste concentration in the feed. A turbulent spray flame reactor is fired on No. 2 fuel oil which is doped with an equimolar mixture of various compounds, including chloroform, chlorobenzene, acrylonitrile, benzene, and 1,1,1-trichloroethane. In spite of the fact that the compounds all are initially at the same concentration, certain operating conditions repeatedly yield a consistent ranking in the extent of compound destruction. The 'destructability' ranking is important in identifying the mechanisms responsible for compound release. Two mechanisms are identified as potential explanations for the compound release behavior. The findings are applied to the problem of using CO and unburned hydrocarbon emissions as indirect indicators of waste destruction performance. The results also

offer insight into the correlation between waste destruction efficiency and initial waste concentration in the feed that has been observed in field data.

Keywords: *Incinerators, *Simulation, *Liquids, Monitors, Waste disposal, Air pollution control, Chlorine organic compounds, Stationary sources, Liquid wastes, Hydrocarbons, Carbon monoxide, Acrylonitriles, Feasibility, Reprints, *Thermal destruction, Incinerator monitoring.

PB91-223354/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Formation of Inorganic Particles during Suspension Heating of Simulated Wastes. Journal article.
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
J. A. Mutholland, A. F. Sarofim, and G. Yue. c1991, 8p EPA/600/J-91/154
Contract EPA-68-02-4247
Pub. in Environmental Progress, v10 n2 p83-88 May 91. Prepared in cooperation with Tsinghua Univ., Beijing (China). Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results of measurements of metal partitioning between the fine condensation aerosol and the larger particles produced during rapid heating of aqueous and organic solutions containing metal additives with widely varying volatilities in a laboratory-scale furnace operated over a range of temperatures (900-1500 K). A stream of monodisperse droplets (nominal diameter of 36 micrometers) was injected into an isothermal, laminar drop-tube reactor, quickly developing into a stream of droplets with heterogeneous size distribution due to droplet collision and coalescence. Gas was introduced to disperse the droplet stream, eliminating droplet interactions after 3 cm (2 ms) of flight. In the remaining 90% of reactor length, the droplets vaporized and burned, yielding inorganic particles of various sizes. Aqueous solutions containing nitrates of Cd, Pb, and Ni gave rise to particles with trimodal size distributions. Partitioning of the larger particles between residual and intermediate modes is suggestive of particle porosity variation. In addition, ultrafine particles, with submicron aerodynamic diameter, were formed, both by the anticipated vaporization pathway and by an unexpected explosive fragmentation mechanism. The fraction of submicron particles produced upon heating of a NiCl2 solution was higher than that formed by the heating of a Ni(NO3)2 solution.

Keywords: *Aerosols, *Separation, *Particle size distribution, *Incinerators, *Simulation, *Condensates, Air pollution control, Stationary sources, Nickel inorganic compounds, Lead inorganic compounds, Cadmium inorganic compounds, Waste disposal, Reprints.

PB91-223362/REB PC **A10/MF A03**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Regional Oxidant Model (ROM) User's Guide. Part 4: The ROM System User Tutorial (Processor Network and Core Model). Final rept. Jan 90-Jun 91.
Computer Sciences Corp., Research Triangle Park, NC.
S. Hallyburton, C. Maxwell, L. Milich, and J. Young. Jun 91, 211p EPA/600/8-90/083D
Contract EPA-68-01-7365
See also PB91-171942. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The volume of the Regional Oxidant Model (ROM) User's Guide is intended to be a 'cookbook' for unloading the ROM system code and benchmark (test case) data from the 19 distribution tapes. The ROM runs on the following computer systems: (1) VAX hardware for the preprocessors and the processor network, and (2) IBM hardware for the core model.

Keywords: *User manuals(Computer programs), *Computerized simulation, *Air pollution, Data base management, Quality assurance, Input/output routines, Computer programs, File maintenance(Computers), *Regional Oxidant Model, VAX system, IBM system.

PB91-223370/REB PC **A11/MF A03**
Robert S. Kerr Environmental Research Lab., Ada, OK.
On-Site Treatment of Creosote and Pentachlorophenal Sludges and Contaminated Soil. Research rept. Jan 88-Apr 90.
Mississippi Forest Products Utilization Lab., Mississippi State.
G. D. McGinnis, H. Borazjani, D. F. Pope, D. A. Strobel, and L. K. McFarland. May 91, 239p EPA/600/2-91/019
Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Information is presented for quantitative evaluation of treatment potential for creosote and pentachlorophenol (PCP) wood treating contaminants in soil systems. The study was conducted in three phases: (1) Characterization, (2) treatability screening and (3) field evaluation. Data generated in phases 1 and 2 were discussed in a previous EPA Report (EPA/-600/2-88-055). The report provides review of data generated during phases 1 and 2 plus discussion of data generated during the two-year field evaluation study. Results from the three-phase study indicated that creosote contaminants, i.e., polycyclic aromatic hydrocarbon (PAH) compounds, and PCP are subject to degradation in soil systems; loading rates and previous exposure of site soil to particular contaminants were identified as important factors in determining rates of transformation for a particular site. Although populations of PAH and PCP acclimated organisms increased markedly when these compounds were applied to test soils, no correlation was found between microbial population levels and transformation rates for specific compounds of concern. Migration of compounds of interest was negligible except in a highly sandy soil from one of the eight sites for which column leaching studies were conducted.

Keywords: *Soil treatment, *Waste treatment, *On-site investigations, *Biological treatment, *Hazardous materials, *Sludge treatment, Wood preservatives, Land pollution control, Field tests, Data processing, Biodeterioration, Chlorine organic compounds, Experimental design, Immobilization, Reviews, Aromatic polycyclic hydrocarbons, Leaching, Environmental transport, Creosote, Site characterization, Phenol/pentachloro.

PB91-223388/REB PC **A07/MF A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Fate of Trace Metals in a Rotary Kiln Incinerator with a Single-Stage Ionizing Wet Scrubber. Volume 1. Technical Results.
Acurex Corp., Jefferson, AR.
D. J. Fournier, and L. R. Waterland. Jul 91, 146p EPA/600/2-91/032A
Contract EPA-68-C9-0038
See also Volume 2, PB91-223396. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A series of pilot-scale incineration tests was performed at EPA's Incineration Research Facility (IRF) in Jefferson, Arkansas, to evaluate the fate of trace metals fed to a rotary kiln incinerator equipped with an ionizing wet scrubber (IWS) for particulate and acid gas control. Test variables were kiln temperature, ranging from 816 to 927 C (1500 to 1700 F); afterburner temperature, ranging from 982 to 1204 C (1800 to 2200 F); and feed chlorine content, ranging from 0 to 8 percent. The test program evaluated the fate of five hazardous constituent trace metals (arsenic, barium, cadmium, chromium, and lead) and four nonhazardous constituent trace metals (bismuth, copper, magnesium, and strontium). The test results indicate that cadmium and bismuth were relatively volatile, with an average of less than 40 percent discharged with the kiln ash. Arsenic, barium, chromium, copper, lead, magnesium, and strontium were relatively nonvolatile, with an average of greater than 80 percent discharged with the kiln ash. Observed relative metal volatilities generally agreed with the volatilities predicted based on vapor pressure/temperature relationships, with the exception of arsenic which was much less volatile than predicted. The volatility of cadmium, bismuth, and lead increased as kiln temperature was increased; the discharge distributions of the remaining metals were not significantly affected by changes in kiln temperature. Apparent scrubber collection efficiencies for the metals averaged 22 to 71 percent, and were generally higher for the less volatile metals. The overall average metal collection efficiency was 43 percent.

Keywords: *Air pollution control equipment, *Incineration, *Waste disposal, *Scrubbers, *Metals, Combustion efficiency, Wet methods, Trace amounts, Kilns, Hazardous materials, Ionization, Temperature, Performance evaluation, Particle size distribution, Pilot plants, Air pollution sampling, Air pollution detection, Concentration(Composition).

PB91-223396/REB PC **A12/MF A03**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Fate of Trace Metals in a Rotary Kiln Incinerator with a Single-Stage Ionizing Wet Scrubber. Volume 2. Appendices.
Acurex Corp., Jefferson, AR.
D. J. Fournier, and L. R. Waterland. Jul 91, 268p EPA/600/2-91/032B
Contract EPA-68-C9-0038
See also Volume 1, PB91-223388. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A series of pilot-scale incineration tests was performed at EPA's Incineration Research Facility (IRF) in Jefferson, Arkansas, to evaluate the fate of trace metals fed to a rotary kiln incinerator equipped with an ionizing wet scrubber (IWS) for particulate and acid gas control. Test variables were kiln temperature, ranging from 816 to 927 C (1500 to 1700 F); afterburner temperature, ranging from 982 to 1204 C (1800 to 2200 F); and feed chlorine content, ranging from 0 to 8 percent. The test program evaluated the fate of five hazardous constituent trace metals (arsenic, barium, cadmium, chromium, andlead) and four nonhazardous constituent trace metals (bismuth, copper, magnesium, and strontium). Volume II contains the appendices to Volume I. It presents the results in tables and graphs.

Keywords: *Air pollution control equipment, *Incineration, *Waste disposal, *Scrubbers, *Metals, Combustion efficiency, Wet methods, Trace amounts, Kilns, Hazardous materials, Graphs(Charts), Temperature, Ionization, Performance evaluation, Particle size distribution, Pilot plants, Air pollution sampling, Air pollution detection, Concentration(Composition), Tables(Data).

PB91-224303/REB PC **A14/MF A03**
Environmental Protection Agency, Washington, DC. Economics and Technology Div.
Reducing Risk in Paint Stripping: Proceedings of an International Conference. Held in Washington, DC. on February 12-13, 1991. Final rept.
JT and A, Inc., Washington, DC.
G. Flock. Jun 91, 308p
Contract EPA-68-DO-0020
Prepared in cooperation with Abt Associates, Inc., Bethesda, MD. Sponsored by Environmental Protection Agency, Washington, DC. Economics and Technology Div.

The International Conference on Reducing Risk in Paint Stripping was held on February 12-13, 1991, in Washington, D.C. Sponsored by the U.S. Environmental Protection Agency, cooperation and support from the National Institute for Occupational Safety and Health, the U.S. Occupational Safety and Health Administration, the U.S. Consumer Product Safety Commission, and the Halogenated Solvents Industry Alliance helped produce a productive and successful conference. The conference focused on managing the use of chemical paint strippers and was intended to identify and promote ways to reduce risks associated with these paint strippers. Serving as a forum for discussion of exposure controls, paint stripper substitutes, and alternative technologies, topics included substitutes for methylene chloride paint strippers; product stewardship programs of methylene chloride producers; opportunities for pollution prevention in paint stripping; and government activities in the United States and other countries. Conference participants included an international group of chemical producers, paint stripper formulators and users, producers of mechanical and other alternative paint stripping technologies, public interest groups, and government officials.

Keywords: *Meetings, *Risk assessment, *Paint removers, *Occupational safety and health, *Air pollution abatement, *Public health, Environmental chemical substitutes, Occupational exposure, Substitutes, Air pollution control, Indoor air pollution, Chloromethanes, Case studies, Exposure, *Paint stripping, Methylene chloride.

PB91-225565/REB PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC. Drinking Water Standards Div.
Radon in Drinking Water: Assessment of Exposure Pathways.
Life Systems, Inc., Cleveland, OH.
14 Jun 91, 31p TR-1242-87
Contract EPA-68-C8-003303-3279
Sponsored by Environmental Protection Agency, Washington, DC. Drinking Water Standards Div.

The purpose of the document is to discuss data that are available to assess release of radon from water, to compare two different approaches to quantifying water contributions to radon concentrations in air and to reach a conclusion on the most appropriate way to evaluate exposure to radon due to its presence in drinking water supplies.

Keywords: *Radon, *Water pollution effects(Humans), *Potable water, *Public health, Radioactive isotopes, Exposure, Ingestion(Biology), Indoor air pollution, Air water interactions, Water pollution sampling, Inhalation, Houses, Path of pollutants, Air pollution effects(Humans).

PB91-225631/REB PC **A08**/MF **A02**
Environmental Protection Agency, Washington, DC. Office of Drinking Water.
Drinking Water Criteria Document on Radium (Final Draft).
Life Systems, Inc., Cleveland, OH.
F. Ennever. 14 Jun 91, 156p TR-1242-85
Contract EPA-68-C8-003303-3279
See also PB86-241866. Sponsored by Environmental Protection Agency, Washington, DC. Office of Drinking Water.

The document provides the health effects basis to be considered in establishing the MCLG for radium. To achieve the objective, data on pharmacokinetics, human exposure, acute and chronic toxicity to animals and humans, epidemiology and the mechanisms of toxicity were evaluated. Specific emphasis is placed on literature data providing dose-response information. Thus, while the literature search and evaluation performed in support of the document was comprehensive, only the reports considered most pertinent in the derivation of the MCLG are cited in the document. The comprehensive literature search in support of the analysis of health effects, exposure and occurrence in the document includes information published up to January, 1991; however, more recent information may have been added during the review process.

Keywords: *Radioactive materials, *Radium, *Potable water, *Water pollution effects, *Water quality, Toxicity, Water pollution standards, Biological effects, Dose-response relationships, Exposure, Epidemiology, Risk assessment, Public health, Carcinogens, Laboratory animals, Natural radioactivity, Air pollution, Inhalation, Ingestion(Biology), Pollution sources, *Maximum Contaminant Level Goals, Pharmacokinetics, Safe Drinking Water Act.

PB91-225649/REB PC **A08**/MF **A02**
Environmental Protection Agency, Washington, DC. Office of Drinking Water.
Drinking Water Criteria Document for Beta and Gamma Emitting Radionuclides. Draft rept.
Clement Associates, Inc., Ruston, LA.
Jun 91, 166p
Prepared in cooperation with Miller (Wade) Associates, Inc., Arlington, VA. Sponsored by Environmental Protection Agency, Washington, DC. Office of Drinking Water.

The document provides the health effects basis to be considered in establishing the MCLG. To achieve the objective, data on pharmacokinetics, human exposure, acute and chronic toxicity to animals and humans, epidemiology and mechanisms of toxicity are evaluated. Specific emphasis is placed on literature data providing dose-response information. Thus, while the literature search and evaluation performed in support of the document was comprehensive, only the reports considered most pertinent in the derivation of the MCLG are cited in the document. The comprehensive literature search in support of the analysis of health effects, exposure and occurrence in the document includes information published up to January, 1991; however, more recent information may have been added during the review process.

Keywords: *Radioactive isotopes, *Beta decay radioisotopes, *Gamma radiation, *Potable water, *Water pollution effects, *Water quality, Dose-response relationships, Toxicity, Biological effects, Exposure, Ingestion(Biology), Pollution sources, Laboratory animals, Epidemiology, Air pollution, Inhalation, Risk assessment, Carcinogens, Public health, *Maximum Contaminant Level Goals, Pharmacokinetics, Safe Drinking Water Act.

PB91-225664/REB PC **A10**/MF **A03**
Environmental Protection Agency, Washington, DC. Drinking Water Standards Div.
Drinking Water Criteria Document for Alpha Emitting Radionuclides. Draft rept.
Clement International Corp., Ruston, LA.
Jun 91, 202p
Prepared in cooperation with Miller (Wade) Associates, Inc., Arlington, VA. Sponsored by Environmental Protection Agency, Washington, DC. Drinking Water Standards Div.

The document provides the health effects basis to be considered in establishing the MCLG for alpha emitting radionuclides. To achieve the objective, data on pharmacokinetics, human exposure, acute and chronic toxicity to animals and humans, epidemiology and the mechanisms of toxicity were evaluated. Specific emphasis is placed on literature data providing dose response information. Thus, while the literature search and evaluation performed in support of the document was comprehensive, only the reports considered most pertinent in the derivation of the MCLG are cited in the document. The comprehensive literature search in support of the analysis of health effects, exposure and occurrence in the document includes information published up to January, 1991; however, more recent information may have been added during the review process.

Keywords: *Radioactive isotopes, *Potable water, *Alpha decay radioisotopes, *Water pollution effects, *Water quality, Dose-response relationships, Toxicity, Biological effects, Exposure, Ingestion(Biology), Pollution sources, Laboratory animals, Epidemiology, Air pollution, Inhalation, Risk assessment, Carcinogens, Public health, *Maximum Contaminant Level Goals, Pharmacokinetics, Safe Drinking Water Act.

PB91-225672/REB PC **A08**/MF **A02**
Environmental Protection Agency, Washington, DC. Drinking Water Standards Div.
Drinking Water Criteria Document for Radon (Final Draft).
Life Systems, Inc., Cleveland, OH.
14 Jun 91, 152p TR-1242-86
Contract EPA-68-C8-003303-3279
See also PB86-239423. Prepared in cooperation with E R G Systems, Inc., St. James, NY. Sponsored by Environmental Protection Agency, Washington, DC. Drinking Water Standards Div.

The document provides the health effects basis to be considered in establishing the MCLG for radon. To achieve the objective, data on pharmacokinetics, human exposure, acute and chronic toxicity to animals and humans, epidemiology and the mechanisms of toxicity were evaluated. Specific emphasis is placed on literature data providing dose-response information. Thus, while the literature search and evaluation performed in support of the document was comprehensive, only the reports considered most pertinent in the derivation of the MCLG are cited in the document. The comprehensive literature search in support of the analysis of health effects, exposure and occurrence in the document includes information published up to January, 1991; however, more recent information may have been added during the review process.

Keywords: *Radon, *Water pollution effects, *Potable water, *Water quality, *Radioactive materials, Water pollution standards, Toxicity, Biological effects, Dose-response relationships, Exposure, Epidemiology, Air pollution, Natural radioactivity, Risk assessment, Carcinogens, Public health, Inhalation, Laboratory animals, Pollution sources, Ingestion(Biology), *Maximum Contaminant Level Goals, Pharmacokinetics, Safe Drinking Water Act.

PB91-225680/REB PC **A08**/MF **A02**
Drinking Water Criteria Document for Uranium. Draft rept.
Environmental Protection Agency, Washington, DC. Office of Drinking Water.
Jun 91, 159p
See also PB86-241049. Prepared in cooperation with Clement Associates, Inc., Ruston, LA., and Miller (Wade) Associates, Inc., Arlington, VA.

The document provides the health effects basis to be considered in establishing the MCLG for uranium. To achieve the objective, data on pharmacokinetics, human exposure, acute and chronic toxicity to animals and humans, epidemiology and the mechanisms of toxicity were evaluated. Specific emphasis is placed on literature data providing dose-response information. Thus, while the literature search and evaluation performed in support of the document was comprehensive, only the reports considered most pertinent in the derivation of the MCLG are cited in the document. The comprehensive literature search in support of the analysis of health effects, exposure and occurrence in the document includes information published up to January, 1991; however, more recent information may have been added during the review process.

Keywords: *Radioactive materials, *Potable water, *Water pollution effects, *Water quality, *Uranium, Dose-response relationships, Toxicity, Biological effects, Exposure, Ingestion(Biology), Pollution sources, Laboratory animals, Epidemiology, Air pollution, Inhalation, Risk assessment, Carcinogens, Public health, *Maximum Contaminant Level Goals, Pharmacokinetics, Safe Drinking Water Act.

PB91-225698/REB PC **A07**/MF **A02**
Environmental Protection Agency, Washington, DC. Drinking Water Standards Div.
Regulatory Impact Analysis of Proposed National Primary Drinking Water Regulations for Radionuclides.
Miller (Wade) Associates, Inc., Arlington, VA.
17 Jul 91, 144p
Contract EPA-68-C0-0069
Sponsored by Environmental Protection Agency, Washington, DC. Drinking Water Standards Div.

The regulatory impact analysis (RIA) was prepared in accordance with Executive Order 12291, which requires that costs and benefits of all major rules be examined and compared. The document also includes an analysis of costs on small water systems as required by the Regulatory Flexibility Act. The document includes the revision of all analysis conducted and summarized in the 1988 draft, as well as additional analysis performed. Topical areas covered in the RIA are problem definition, market imperfections and consideration of regulatory alternatives, assessment of total National costs, assessment of benefits, summary of costs and benefits, and regulatory flexibility and paperwork reduction analysis.

Keywords: *Radioactive isotopes, *Pollution regulations, *Potable water, *Benefit cost analysis, *Water pollution economics, Water pollution control, Substitutes, Marketing, Public health, Biological effects, Water pollution standards, Standards compliance, Radioactive waste disposal, Carcinogens, Waste treatment, Exposure, Radiation monitoring, *National Primary Drinking Water Regulations.

PB91-225706/REB PC **A05**/MF **A01**
Procedures for Establishing Emissions for Early Reduction Compliance Extensions. Volume 1. Synthetic Organic Chemical Manufacturing, Ethylene Oxide Sterilization, and Chromium Electroplating. Draft rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Jul 91, 94p EPA/450/3-91/012A

Regulations have been proposed governing compliance extensions for Early Reductions of Hazardous Air Pollutants (HAP). The regulations allow a six year MACT standard compliance extension for sources that achieve HAP reductions of 90% (95% for particulates) from a base year of 1987 (or more recent base year). The document includes acceptable emission estimating techniques that can be used when source testing is not feasible. The document includes techniques for synthetic organic chemical manufacturing, ethylene oxide sterilization, and chromium electroplating.

Keywords: *Chromium, *Air pollution, *Electroplating, Waste water, Standards, Ethylene oxide, Storage tanks, Equipment, Leakage, Sterilization, Compliance, MACT Standards.

PB91-226308/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Pilot-Scale Incinerability Evaluation of Arsenic- and Lead-Contaminated Soils from Two Superfund Sites. Conference paper.
Acurex Corp., Jefferson, AR.
L. R. Waterland, C. King, R. H. Vocque, M. K. Richards, and H. O. Wall. 1991, 12p EPA/600/D-91/176
Contract EPA-68-C9-0038
Proceedings of the Incineration Conference, Knoxville, TN., May 13-17, 1991. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Two incineration test programs were conducted at EPA's Incineration Research Facility to evaluate the suitability of incineration as an option to treat contaminated Superfund site soils. The soils from the Purity Oil Sales site in Region 9 are contaminated with lead, up to several percent sulfur, and, to a lesser extent, hazardous organic constituents. The soil from the Baird and McGuire Superfund site in Region 1 is contaminated with pesticides, arsenic, and, to a lesser extent, lead. Incineration could be considered applicable to the treatment of the three Purity Oil Sales site soils tested based on effective semivolatile organic decontamination, in-compliance (with federal standards) particulate emissions, and low SO2/SO3 emissions. However, these tests results suggest that the resulting kiln ash would be a toxicity characteristic hazardous waste due to its leachable lead content. Similarly, for the Baird and McGuire site soils, organic decontamination of the tested materials was effective. Between 36 and 76 percent of the measured arsenic and between 69 and 94 percent of the measured lead were discharged in the kiln bottom ash depending on kiln temperature. The low TCLP leachability of the lead in the kiln bottom ash was not affected by the test variables kiln temperatures and kiln exit flue gas O2. However, the ash arsenic resulting from high excess air operation was significantly less leachable than that from low excess air operation, and was somewhat more leachable at high temperature than at low temperature.

Keywords: *Waste disposal, *Soil contamination, *Incineration, *Superfund, *Air pollution control, Soil treatment, Arsenic, Lead(Metal), Fly ash, Hazardous materials, Leaching, Pilot plants, Performance evaluation, Reprints.

PB91-226316/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Evaluation of Volumetric Leak Detection Methods Used in Underground Storage Tanks. Journal article.
Vista Research, Inc., Mountain View, CA.
J. W. Maresca, J. W. Starr, R. D. Roach, D. Naar, and R. Smedfield. c1991, 41p EPA/600/J-91/155
Contract EPA-68-03-3409
Pub. in Jnl. of Hazardous Materials, v26 p261-300 1991. See also Volume 1, PB89-124333. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The report documents a research program which evaluated the performance of 25 commercially available volumetric test methods for the detection of small leaks in underground gasoline storage tanks. The methodology used made it possible to determine most of the technological issues associated with volumetric leak detection. The approach used (1) experimentally validated models of the important sources of ambient noise that affect volume changes in nonleaking and leaking tanks, (2) a large database of product-temperature changes that result from the delivery of product at a temperature different from that of the product in the tank, and (3) a mathematical model of each test method to estimate the performance of that method. The majority of the methods claimed to be able to reliably detect leak rates as small as 190 ml/h (0.05 gal/h). The results of the study showed that these claims were not met. Five of the methods had the potential to detect leak rates as small as 380 + or - 190 ml/h (0.10 + or - 0.05 gal/h) with a probability of detection of 0.95 and a probability of false alarm of 0.05. Performance was found to be limited primarily by test protocol, operational sensor configuration, data analysis, and calibration, rather than by hardware. The experimental analysis and model calculations suggested that substantial performance improvements could be realized by making only procedural changes. (Copyright (c) 1991--Elsevier Science Publishers B.V.)

Keywords: *Fuel storage, *Underground storage, *Leakage, *Volumetric analysis, *Land pollution, Performance evaluation, Temperature effects, Mathematical models, Experimental design, Acoustic detection, Structural analysis, Deformation, Ground water, Water pollution, Reprints.

PB91-226324/REB PC **A02/MF A01**
Acidic Lakes and Streams in the United States: The Role of Acidic Deposition. Journal article.
Corvallis Environmental Research Lab., OR.
L. A. Baker, A. T. Herlihy, P. R. Kaufmann, and J. M. Eilers. c1991, 7p EPA/600/J-91/156
Pub. in Science, v252 p1151-1154, 24 May 91. Prepared in cooperation with E and S Environmental Chemistry, Inc., Corvallis, OR.

A statistically designed survey of lakes and streams in acid-sensitive areas of the United States, the National Surface Water Survey (NSWS), was used to identify the role of acidic deposition, relative to other factors, in causing acidic conditions in 1,181 lakes and 4,668 streams. Atmospheric deposition is the dominant source of acid anions in 75% of the acidic lakes and 47% of the acidic streams. Organic anions are dominant in one-fourth of the acidic lakes and streams; acidic mine drainage is the dominant acid source in 25% of the acidic streams. Other causes of acidic conditions are relatively unimportant on a regional scale. Nearly all the deposition-dominated acidic systems were found in six well-delineated subpopulations that represent about one-fourth of the NSWS lake population and one-third of the NSWS stream population. (Copyright (c) 1991 by the American Association for the Advancement of Science.)

Keywords: *Surface waters, *Acidification, *Air water interactions, *Water pollution, *Deposition, Lakes, Streams, United States, Pollution sources, Air pollution, Statistical analysis, Acid mine drainage, Precipitation(Meteorology), Wet methods, Dry methods, Reprints, National Surface Water Survey.

PB91-226332/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Evaluation of Procedures for Aggregating Nonlinear Sulfate Adsorption Isotherm Data. Journal article.
NSI Technology Services Corp., Corvallis, OR.
P. W. Shaffer, and D. L. Stevens. c1991, 11p EPA/600/J-91/157
Contract EPA-68-03-3246
Pub. in Soil Science Society of American Jnl., v55 p684-692 1991. Sponsored by Corvallis Environmental Research Lab., OR.

As part of a study to assess potential regional surface-water acidification in the southern Blue Ridge region of the USA, more than 700 individual soils were sampled from 35 watersheds and analyzed. Sulfate adsorption isotherms were generated for all mineral soil horizons. Subsequent use of these data in dynamic watershed chemistry models required aggregation of adsorption data to two or three isotherms (one per soil mineral horizon) per watershed. The study evaluated several techniques for aggregation of the nonlinear adsorption-isotherm data. Results of the study show that aggregated-data values are extremely sensitive to the choice of aggregation procedure. The aggregated-coefficient and aggregated-point procedures appear to be straight-forward, reasonable approaches to data aggregation, but the aggregated functions generated by these procedures are usually biased; use of these procedures is strongly discouraged. In contrast, the aggregated-isotherm approach provided an effective means of aggregating data, even for very heterogeneous groups of isotherms; use of this procedure is recommended for aggregation of adsorption isotherms and for data for similar non-linear functions.

Keywords: *Inorganic sulfates, *Soil analysis, *Adsorption, *Land pollution, *Water pollution, Isotherms, Watersheds, Procedures, Acidification, Deposition, Surface waters, Water chemistry, Environmental transport, Nonlinear systems, Reprints.

PB91-226340/REB PC **A03/MF A01**
Physical and Morphological Measures of Waste Solidification Effectiveness.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
W. E. Grube. 1991, 16p EPA/600/D-91/164
Presented at the Air and Waste Management Association Annual Meeting and Exhibition (83rd), Pittsburgh, PA., June 24-29, 1990.

The paper describes and discusses physical testing to characterize wastes treated by the Soliditech cement-solidification/stabilization process. In addition, morphological measures included documented observations and measurements of components of structure and form of the treated materials. The paper provides data to relate easily measured physical and morphological properties with intensive chemical extraction and solute leachability information obtained from standardized tests.

Keywords: *Waste treatment, *Solidification, *Stabilization, *Physical tests, *Morphology, Cement, Waste forms, Extraction, Leaching, Hazardous materials, Density(Mass/volume), Permeability, Durability, Physical properties, Structural analysis, *Soliditech process.

PB91-226357/REB PC **A02/MF A01**
Role of Quality Assurance in Minimizing Errors in Stationary Source Field Sampling.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
M. D. Jackson, and M. R. Midgett. 1991, 7p EPA/600/D-91/166

Several regulations require the use of stationary source stack sampling procedures to determine the amount of emissions. The procedures are costly and require much planning and time to complete. If there are errors in any procedure, they might not be discovered until after the sampling trip. One way to reduce the chance of errors is to have and to follow a quality assurance plan. The paper discusses the planning and possible errors and how the quality assurance plan may prevent or minimize errors.

Keywords: *Stationary sources, *Pollution sources, *Air pollution sampling, *Quality assurance, Concentration(Composition), Error analysis, Stacks, Procedures.

PB91-226365/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Three-Dimensional Contaminant Distribution in an Office Space. Rept. for Sep 89-May 90.
Research Triangle Inst., Research Triangle Park, NC.
S. D. Kim, T. Yamamoto, D. S. Ensor, and L. E. Sparks. 1991, 8p EPA/600/D-91/167
Grant EPA-R-814169-01-0
Presented at Indoor Air '90, Toronto, July 28-August 3, 1990. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses the numerical solution of a three-dimensional particle diffusion model to determine the contaminant concentration profiles in a typical office space. The concentration profiles at occupants' respiratory levels are of particular interest to evaluate indoor air quality and ventilation effectiveness. The effects of air exchange rate and contaminant diffusion on ventilation are presented.

Keywords: *Office buildings, *Indoor air pollution, *Particles, *Mathematical models, *Air quality, Three-dimensional calculations, Concentration(Composition), Diffusion, Ventilation, Air pollution sampling, Air flow, Environmental engineering.

PB91-226373/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Comparison of Local and Central Controls for Indoor Air Quality.
Research Triangle Inst., Research Triangle Park, NC.
M. K. Owen, P. A. Lawless, D. S. Ensor, and L. E. Sparks. 1991, 8p EPA/600/D-91/168
Grant EPA-R-814169-01-0

Presented at Indoor Air '90 held in Toronto (Canada) on July 28-August 3, 1990. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results of a determination of the relative effectiveness of local versus central control through the heating, ventilating, and air conditioning (HVAC) system. Since many sources cannot be removed from indoors, it is important to know the impact of the source in the room, as well as in the building as a whole. The decrease in contamination resulting from source venting, in-room air cleaners, increased ventilation from the HVAC, and air cleaners in the HVAC system was examined. The Indoor Air Quality Simulator for Personal Computers (IAQPC) was used to study a variety of the options available in a building with an HVAC system. A building layout and a steady source were chosen. The time-dependent concentrations in the building were determined. The air cleaning options tested were (1) increased ventilation through the HVAC system and (2) in-room and HVAC system air cleaners. The reductions in concentrations for the building as a whole and for source and nonsource rooms are reported.

Keywords: *Air pollution control, *Indoor air pollution, *Environmental engineering, *Buildings, *Air quality, Pollution sources, Ventilation, Heating systems, Air conditioning, Air cleaners, Computerized simulation, Concentration(Composition), Air pollution sampling.

PB91-226381/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Retrofit Costs of SO2 and NOx Control at 200 U.S. Coal-Fired Power Plants.
Radian Corp., Research Triangle Park, NC.
T. E. Emmel, M. Maibodi, and N. Kaplan. 1991, 31p EPA/600/D-91/169
Contract EPA-68-02-4286
Presented at the Pittsburgh Coal Conference held in Pittsburgh, PA. on September 11, 1990. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results of a study to improve engineering applying cost estimates currently being used to evaluate the economic effects of applying SO2 and NOx controls at 200 large SO2 emitting coal-fired utility plants in the U.S. To accomplish the objective, procedures were developed and used that account for site-specific retrofit factors. The site-specific information was obtained from aerial photographs, generally available data bases, and inputs from utility companies. Cost results are presented for the following control technologies: lime/limestone flue gas desulfurization, lime spray drying, coal switching, furnace and duct sorbent injection, low NOx injection or natural gas reburn, and selective catalytic reduction. Although the cost estimates provide useful site-specific cost information on retrofitting acid gas controls, the costs are estimated for a specific time period and do not reflect future changes in boiler and coal characteristics (e.g., capacity factors and fuel prices) or significant changes in control technology cost and performance.

Keywords: *Coal fired power plants, *Air pollution control, Retrofitting, Nitrogen oxides, Sulfur dioxide, Limestone scrubbing, Flue gas, Desulfurization, Costs, Economic analysis.

PB91-226399/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Permeability Properties of Fly Ash from Furnace Sorbent Injection Process.
Acurex Corp., Research Triangle Park, NC.
W. Jozewicz, B. K. Gullett, and T. Hueckel. 1991, 21p EPA/600/D-91/170
Contracts EPA-68-02-4701, EPA-68-D0-0141
Prepared in cooperation with Duke Univ., Durham, NC. Dept. of Civil and Environmental Engineering. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab., and Illinois Dept. of Energy and Natural Resources, Springfield.

The paper discusses tests of the applicability of furnace sorbent injection (FSI) waste solids for use as synthetic waste landfill liners by measuring the mechanical strength and permeability of moisture-cured samples. FSI waste solids were received from the EPA-sponsored demonstration of limestone injection multistage burner (LIMB) technology at Ohio Edison's Edgewater power plant. The demonstration coal was about 3% sulfur, and the sorbent used was calcium hydroxide--Ca(OH)2--modified with lignosulfonate. Samples of FSI waste were moisture-cured and analyzed for formation of ettringite, which--in cementitious systems--can cause disruption of structure if formed after the cement paste has hardened. No ettringite was detected and mechanical strength, as measured by unconfined compressive strength, increased with longer moisture curing time. Permeability of moisture-cured samples decreased with increasing moisture curing time. The increase of mechanical strength and accompanying decrease of permeability are believed to be due to the effect of the formation of bonds between the fly ash and Ca(OH)2 with subsequent filling of intraparticle voids, evidenced by increasing specific surface area of FSI waste samples cured for long periods of time. Examination of morphology by SEM confirmed structure development.

Keywords: *Waste utilization, *Air pollution control, *Fly ash, *Land pollution control, *Hazardous materials, Earth fills, Injection, Linings, Mechanical properties, Calcium hydroxides, Permeability, Chemical bonds, Morphology, Structural analysis, *Furnace Sorbent Injection, Limestone Injection Multistage Burners.

PB91-226407/REB PC **A02**/MF **A01**
Mitigating Radon in Two Four-Story Dormitories.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
D. B. Harris. Feb 91, 10p EPA/600/D-91/171
Presented at the Annual Meeting, AWMA (84th) held in Vancouver, B.C. on June 16-21, 1991.

The paper gives results of the mitigation of radon in two four-story dormitories. During a survey of campus buildings, a western university identified two four-story dormitories with several rooms on the lowest level with radon levels above the EPA guidelines of 4 pCi/L. EPA's Air and Engineering Research Laboratory joined an experienced radon mitigator and the university to develop mitigation systems to reduce these levels. The diagnostic process is discussed and the development of the very different solutions needed for the two buildings is presented. Short-term test results are presented which show the success achieved.

Keywords: *Radon, *Radionuclide migration, *School buildings, *Indoor air pollution, *Air pollution control, Mitigation, Soil gases, Environmental engineering, Design criteria, Performance evaluation, *Dormitories, Subslab depressurization systems.

PB91-226415/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Measurement of Methane Emissions in the Plume of a Large Surface Coal Mine Using Open-Path FTIR Spectroscopy.
Alliance Technologies Corp., Chapel Hill, NC.
S. D. Piccot, A. Chadha, D. A. Kirchgessner, R. Kagann, and M. J. Czerniawski. 1991, 24p EPA/600/D-91/172
Contract EPA-68-D9-0173
Presented at the Air and Waste Management Association Conference, Vancouver, B.C., June 16-21, 1991. Prepared in cooperation with MDA Scientific, Inc., Norcross, GA., and Blasland, Bouck and Lee, Edison, NJ. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results of a portion of an overall study to: (1) develop a methane measurements methodology and protocol that can be used at large surface mining operations, (2) conduct a field trial of this methodology and protocol and identify methodology modifications that are warranted based on field trial results, and (3) estimate the total emissions from the mine where the field trial was conducted. Specifically, the paper describes results of a study to develop a measurements methodology for surface mines and to field test the methodology at an actual surface mine. The research conducted to examine alternative measurements approaches and to develop the methodology and protocol is described first. A brief discussion of the preliminary results from the field trial is also presented. Emissions from a variety of human activities may be contributing to the buildup of greenhouse gases in the atmosphere. Carbon dioxide and other trace gases such as methane, nitrous oxide, and chlorofluorocarbons are among the greenhouse gases that have been identified as contributing to global climate change phenomena. The significance of methane as a greenhouse gas is a relatively recent concern. Current global emission estimates indicate that coal mining contributes 25-45 Tg of methane per year, or about 10% of total global anthropogenic methane emissions.

Keywords: *Natural emissions, *Methane, *Air pollution detection, *Surface mining, Sampling, Gas analysis, Coal mining, Fourier transform spectrometers, Infrared spectroscopy, Field tests, Greenhouse effect, Global warming, Atmospheric composition.

PB91-226423/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Current Status of ADVACATE Process for Flue Gas Desulfurization. Rept. for Sep 90-Mar 91.
Acurex Corp., Research Triangle Park, NC. Environmental Systems Div.
B. W. Hall, C. Singer, W. Jozewicz, C. B. Sedman, and M. A. Maxwell. 1991, 22p EPA/600/D-91/173
Contract EPA-68-DO-0141
Presented at the Air and Waste Management Association Annual Meeting, Vancouver, B.C., June 16-21, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses current bench- and pilot-plant advances in preparation of ADVAnced siliCATE (ADVACATE) calcium silicate sorbents for flue gas desulfurization. It also discusses current bench- and pilot-plant advances in sorbent preparation. Fly ash was ground in a laboratory-scale grinder prior to slurrying in order to decrease the slurrying time needed for the sorbent to be reactive with SO2. Reactivity of ADVACATE sorbents with SO2 in the bench-scale reactor correlated with their surface area. ADVACATE sorbents produced with ground fly ash were evaluated in the 1.42 cu m/min pilot plant, providing 2 s duct residence time. ADVACATE sorbent was produced by slurrying ground fly ash (4.3 micrometer median particle size) with Ca(OH)2 at a weight ratio of 3:1 at 90 C for 3 h to yield solids with 30 wt % of initial free moisture. When this sorbent was injected into the duct with 1500 ppm SO2 and at 11 C approach to saturation, the measured SO2 removal was about 60% at a Ca/S stoichiometric ratio of 2.0. Previously, when ADVACATE sorbent was produced at 90 C and at the same fly-ash-to-Ca(OH)2 weight ratio using unground fly ash, removal under the same conditions in the duct was about 50% following 12 h slurrying. The report gives results of pilot-scale recycle tests at the recycle ratio of 2.0. Finally, the report discusses EPA's plans to commercialize ADVACATE.

Keywords: *Air pollution control, *Waste utilization, *Fly ash, Flue gases, Desulfurization, Sorbents, Slurries, Calcium silicates, Sulfur dioxide, Calcium hydroxides, *ADVACATE process, *Flue gas desulfurization.

PB91-226431/REB PC **A02**/MF **A01**
Summary of Joint DOD/EPA Research to Control VOCs and Toxic Emissions. Rept. for Sep 84-Feb 91.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
C. H. Darvin, and J. D. Wander. 1991, 8p EPA/600/D-91/174
Presented at the Air and Waste Management Association Meeting, Vancouver, B.C. on June 16-21, 1991. Prepared in cooperation with Air Force Engineering and Services Center, Tyndall AFB, FL.

The paper summarizes the results of joint projects conducted during the last 6 years by the Department of Defense and EPA to control volatile organic compounds (VOCs) and toxic emissions. Major emphasis has been on product coating and metal finishing: (1) paint stripping using plastic media blasting, (2) carbon adsorption for methylchloroform and Freon emissions, (3) fluidized-bed catalytic incineration and hybrid carbon adsorption incineration, (4) paint spray booth wet-to-dry conversion, and (5) catalytic oxidation for controlling chlorinated VOCs.

Keywords: *Volatile organic compounds, *Air pollution control, *Incinerators, *Performance evaluation, Paint removers, Spray painting, Air pollution, Adsorbents, Carbon, Stationary sources, Fluorohydrocarbons, *Catalytic oxidation, Chloroforms.

PB91-226449/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Evaluation of the Acceptability of Natural Gas as a Mitigating Fuel for Utility Combustion Sources.
Radian Corp., Austin, TX.
C. E. Burklin, T. P. Nelson, and B. Tilkicioglu. Jun 91, 13p PAPER-91-122.2, EPA/600/D-91/175
Contract EPA-68-D0-0125
Presented at the Air and Waste Management Association Annual Meeting (84th), Vancouver, B.C., June 16-21, 1991. Prepared in cooperation with Pipeline Systems, Inc., Walnut Creek, CA. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives preliminary findings of a joint EPA/Gas Research Institute study of methane (CH4) loss from the U.S. natural gas industry. The study, not scheduled for completion until 1992, is part of an effort to resolve the issue of CH4 emissions from natural gas production and distribution. Early estimates of the loss of CH4 from natural gas production were based on gas company records of 'unaccounted for (UAF) gas,' and ranged from 2 to 4% of the natural gas produced. However, UAF gas was a bookkeeping adjustment and did not represent an estimate of CH4 lost to the atmosphere. CH4 has been implicated as a significant greenhouse gas, perhaps second only to carbon dioxide (CO2). While CH4 concentrations in the atmosphere are lower than those of CO2, its warming potential is thought to be from 10 to 140 times greater than that of CO2 on a mass basis. CH4 is also considered to be a product of the production and transportation of natural gas to the consumer. If the losses of CH4 during natural gas production were large enough, they could greatly reduce or even negate the greenhouse benefits from switching to natural gas combustion.

Keywords: *Natural gas, *Greenhouse effect, *Methane, Carbon dioxide, Air pollution, Global warming, Stationary sources, Combustion products, Electric utilities.

PB91-226456/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Continental Scale Biome Responses to Climatic Change. Symposium paper.
ManTech Environmental Technology, Inc., Corvallis, OR.
R. P. Neilson, and G. A. King. Apr 91, 43p EPA/600/D-91/177
Contract EPA-68-C8-0006
Prepared in cooperation with Oregon State Univ., Corvallis. Sponsored by Corvallis Environmental Research Lab., OR.

Current projections of climatic change call for a global average temperature increase of 2.8 to 5.2 C and a 7% to 16% increase in rainfall by about 2030. The potential ecological responses to these changes have been estimated using a variety of techniques, but have generally been restricted to relatively small scales. More recently, the global response of terrestrial ecosystems has been estimated using the steady-state correlation approaches of Holdridge and Box. Double-CO2 climatic scenarios applied to these approaches suggest that the temperature and boreal ecosystems could be displaced toward the poles by hundreds of kilometers. The spatial displacement of extratropical biomes could range from about 50% to near 90% of their current latitudinal extents.

Keywords: *Biomes, *Air-biosphere interactions, *Climatic changes, *Terrestrial ecosystems, Atmospheric temperature, Spatial distribution, Rainfall, Global warming, Mathematical models, Study estimates, Biogeography, Air pollution.

PB91-226464/REB PC A03/MF A01
GIS Procedure to Create a National Lakes Frame for Environmental Monitoring. Symposium paper.
Corvallis Environmental Research Lab., OR.
A. R. Selle, D. P. Larsen, and S. G. Paulsen. 1991, 14p EPA/600/D-91/178
Proceedings of the ESRI User Conference, Palm Springs, CA., May 20-24, 1991. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR., and Nevada Univ., Las Vegas.

A resource frame is necessary for regional or national scale environmental monitoring so that resources can be selected for sampling with known probability of inclusion. Paper maps have traditionally been used as frames, but they require a significant labor commitment in analog-to-digital conversion. The authors present an automated Geographic Information System (GIS) procedure that creates a lakes frame from the hydrographic layer of the USGS 1:100,000-scale Digital Line Graphs (DLGs). The procedure processes 1:250,000 quad equivalents per run, and is portable to any machine supported by the GIS software. Although developed for the U.S. Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP), the procedure may be useful to others in environmental management.

Keywords: *Environmental monitoring, *Environmental management, *Lakes, *Aquatic ecosystems, *Water pollution effects, Procedures, Data processing, Hydrography, Surface waters, Maps, *Geographic Information System, *Environmental Monitoring and Assessment Program, Digital Line Graph.

PB91-226472/REB PC A03/MF A01
Toward a Rule-Based Biome Model.
Corvallis Environmental Research Lab., OR.
R. P. Neilson, G. A. King, and G. Koerper. 1991, 45p EPA/600/D-91/179
Prepared in cooperation with Oregon State Univ., Corvallis, and ManTech Environmental Technology, Inc., Corvallis, OR.

Current projections of the response of the biosphere to global climatic change indicate as much as 50% to 90% spatial displacement of extratropical biomes. The mechanism of spatial shift could be dominated by either (1) competitive displacement of northern biomes by southern biomes, or (2) drought-induced dieback of areas susceptible to change. The current suite of global biosphere models cannot distinguish between these two processes, thus determining the need for a mechanistically based biome model. The model is in an early stage of development and will require several enhancements, including explicit simulation of potential evapotranspiration, extension to boreal and tropical biomes, a shift from steady-state to transient dynamics, and validation on other continents.

Keywords: *Biomes, *Air-biosphere interactions, *Climatic changes, *Mathematical models, Vegetation, Precipitation(Meteorology), Evapotranspiration, Ecosystems, Greenhouse effect, Spatial distribution, Plants(Botany), Biogeography, Air pollution.

PB91-226480/REB PC A03/MF A01
Climate Change and Global Isoprene Emissions. Symposium paper.
Corvallis Environmental Research Lab., OR.
D. P. Turner, A. G. Wones, D. Pross, and D. L. Phillips. 1991, 19p EPA/600/D-91/180
Proceedings of the Air and Waste Management Association Meeting held in Vancouver, B.C. on June 16-21, 1991. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR., and Oregon State Univ., Corvallis.

Emission of isoprene from vegetation affects tropospheric chemistry at the regional and global scales. Projected global climate change will potentially alter emission rates, with corresponding influences on concentrations of ozone and other radiatively important trace gases. Progress has been made in surveying plant species for their baseline emission rates and in understanding the physiology of the response of emission to environmental factors such as temperature, light and atmospheric CO2 concentration. However, few tree species of tropical environments have been studied nor have the details of isoprene biosynthesis or its functional significance been elucidated. Relatively simple emission models at regional to global scales have been developed using geographic databases for temperature and vegetation characteristics. Isoprene emissions are expected to rise in response to projected global climate change because of increases in temperature and an increased areal extent of high isoprene emitting forest types. There remains great uncertainty about such projections however, considering the uncertainties in the emissions modeling (about a factor of 3), uncertainties in the climate modeling, the future influence of anthropogenic factors on vegetation change, and the unmodeled influence of high CO2 on isoprene biosynthesis. There is a need to improve the modeling of emissions as inputs to global atmospheric chemistry models which in turn can be used to evaluate the effects of changing emissions on concentrations of tropospheric ozone and other radiatively important gases.

Keywords: *Climatic changes, *Natural emissions, *Air pollution, *Emission factors, *Isoprene, Atmospheric chemistry, Vegetation, Ozone, Global aspects, Mathematical models, Carbon dioxide, Global warming, Troposphere, Non-methane hydrocarbons, Volatile organic compounds.

PB91-226498/REB PC A03/MF A01
Monitoring Environmental Changes in Lakes Using Algal Microfossils.
Corvallis Environmental Research Lab., OR.
S. S. Dixit, B. F. Cumming, J. P. Smol, and J. C. Kingston. 1991, 27p EPA/600/D-91/181
Proceedings of the International Symposium on Ecological Indicators, Fort Lauderdale, FL., October 16-19, 1990. Prepared in cooperation with Queen's Univ., Kingston (Ontario). Dept. of Biology.

Algal microfossils are especially powerful tools for ecological monitoring programs because they can be used to assess deterioration and/or recovery in aquatic ecosystems, even when direct historical data are not available. Sedimentary diatom and chrysophyte assemblages have been the most widely used retrospective indicators. These assemblages have repeatedly proven to be reliable indicators for evaluating present-day surface water quality in comparison with natural ('reference' or 'background') conditions. Within the last few years, many advances have occurred in algal microfossil research. The paper describes the applicability and strengths of these new approaches, and shows how they can be successfully integrated into ecological monitoring programs.

Keywords: *Environmental monitoring, *Lakes, *Biological indicators, *Aquatic ecosystems, *Water pollution effects, Algae, Fossils, Surface waters, Water quality, Paleoecology, Paleolimnology, Diatoms.

PB91-226506/REB PC A03/MF A01
Atmospheric Formaldehyde and the Potential for Plant Effects.
Corvallis Environmental Research Lab., OR.
J. R. Barker, J. M. Lantis, and D. T. Tingey. 1991, 18p EPA/600/D-91/182
Presented at the Air and Waste Management Association Annual Meeting (84th), Vancouver, Canada, June 16-21, 1991. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR.

According to the Spatial Multimedia Compartmental Model (SMCM) predictions, elevated atmospheric formaldehyde concentrations may occur as a result of switching from conventional fuels to methanol fuel. Obviously, the degree of impact on urban, agricultural, and natural vegetation will depend on the pattern of exposure, concentration, and plant sensitivity. A complete analysis of the impact of formaldehyde on plant growth and development cannot be ascertained from the literature because of limited data and insufficient exposure scenarios. Both laboratory and field studies are needed to provide sufficient data for risk assessments. Vegetation research is needed to document the dose-response of plants to various formaldehyde concentrations and exposure patterns. Also, data on the exposure, fate and effects of formaldehyde in soils are needed to validate the SMCM prediction that the chemical will enter into the soil at high concentrations through wet deposition.

Keywords: *Air pollution effects(Plants), *Formaldehyde, *Plants(Botany), Exposure, Biological effects, Soils, Wet methods, Deposition, Air-biosphere interactions, Plant growth, Alcohol fuels, Exhaust emissions, Methanol, Spatial Multimedia Compartmental Model.

PB91-226514/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
In the Footsteps of Robert Marshall: Proposed Research of White Spruce Growth and Movement at the Tree Limit, Central Brooks Range, Alaska. Symposium paper.
ManTech Environmental Technology, Inc., Corvallis, OR.
T. D. Droessler. 1991, 13p EPA/600/D-91/183
Contract EPA-68-C8-0006
Proceedings of the International Conference on the Role of the Polar Regions in Global Change, Fairbanks, AK., June 11-15, 1990. Sponsored by Corvallis Environmental Research Lab., OR.

The proposed research will quantify white spruce growth and document its latitudinal stability at the tree limit in the central Brooks Range over the life span of the living trees. The goal is to link tree growth and tree position to summer temperature and precipitation. Historical records from 1929 to 1938 from work by Robert Marshall have been used to identify tree limit sites and provide information to interpret the present location of the tree limit.

Keywords: *Climatic changes, *Spruces, *Plant growth, *Trees(Plants), Arctic regions, Brooks Range, Atmospheric temperature, Alaska, Precipitation(Meteorology), Forecasting, Life cycles, Position(Location), *Tree limits, Tree cores.

PB91-226522/REB PC **A04**/MF **A01**
Corvallis Environmental Research Lab., OR.
Sensitivity of the Regional Water Balance in the Columbia River Basin to Climate Variability: Application of a Spatially Distributed Water Balance Model. Symposium paper.
ManTech Environmental Technology, Inc., Corvallis, OR.
J. Dolph, D. Marks, and G. King. 1991, 62p EPA/600/D-91/184
Pub. in New Perspectives for Watershed Management: Balancing Long Term Sustainability with Cumulative Environmental Change, 1991. Sponsored by Corvallis Environmental Research Lab., OR.

A one-dimensional water balance model was developed and used to simulate water balance for the Columbia River Basin. The model was run over a 10 km x 10 km grid for the United State's portion of the basin. The regional water balance was calculated using a monthly time-step for a relatively wet year, a relatively dry year, and for a double CO2 climate scenario. Input data, spatially distributed over the grid, included precipitation, maximum soil storage retention capacity, potential evapotranspiration (ET), runoff and soil storage. Model performance was assessed by comparing modeled ET and runoff with the input precipitation data, and by comparing modeled runoff with measured runoff. The model reasonably partitions incoming precipitation to evapotranspiration and runoff. However, modeled total annual runoff was significantly less than measured runoff, primarily because precipitation is underestimated by the network of measurement stations and because of limitations associated with the interpolation procedure used to distribute the precipitation across the grid.

Keywords: *Water balance, *Columbia River Basin, *Climatic changes, *Air-biosphere interactions, *Mathematical models, Spatial distribution, Regional analysis, Hydrology, Air pollution, Soil water, Precipitation(Meteorology), Evaporation, Runoff, Evapotranspiration.

PB91-226530/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Carbon Sequestration in Soils and Global Climatic Change. Symposium paper.
ManTech Environmental Technology, Inc., Corvallis, OR.
M. G. Johnson, and J. S. Kern. 1991, 11p EPA/600/D-91/185
Proceedings of the North American Conference on Forestry Responses to Climate Change, 1991. Sponsored by Corvallis Environmental Research Lab., OR.

The storage of carbon in soils is a very complex phenomenon. Although it is not fully characterized or understood, steps can be taken to use soils as a reservoir of carbon. The role of soils in the carbon cycle must be more fully understood to develop strategies to mitigate increases in atmospheric biosphere. Likewise, the effects of specific management practices on soil carbon cycling and storage must be more fully understood. The gaps in our knowledge of soils and ecosystems, and their response to climatic change, necessitate additional research before quantifiable projections of the role of soils in global climatic change can be made.

Keywords: *Soil sciences, *Carbon, *Climatic changes, *Air pollution, *Land pollution, Carbon cycle, Global warming, Environmental transport, Air-biosphere interactions, Greenhouse effect, Radiative heat transfer.

PB91-227363/REB PC **A08**/MF **A02**
National Technical Information Service: Records of Decision Abstracts FY82-FY85.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
6 Feb 86, 169p* OERR-9355.3-13

This is a compilation of Record of Decision Abstracts FY82-FY85.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Bibliographies, Abstracts, Water pollution, Land pollution, Surface waters, Ground water, Chemical compounds, Waste disposal, Remedial action, United States, *National Technical Information Service, *Record of Decision.

PB91-227942/REB PC **A09**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Volumetric Leak Detection in Large Underground Storage Tanks. Volumes 1 and 2.
Vista Research, Inc., Mountain View, CA.
J. W. Starr, R. F. Wise, and J. W. Maresca. Aug 91, 178p EPA/600/2-91/044A
Contract EPA-68-03-3409
Portions of this document are not fully legible. Prepared in cooperation with CDM Federal Programs Corp., Fairfax, VA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A set of experiments was conducted to determine whether volumetric leak detection system presently used to test underground storage tanks (USTs) up to 38,000 L (10,000 gal) in capacity could meet EPA's regulatory standards for tank tightness and automatic tank gauging systems when used to test tanks up to 190,000 L (50,000 gal) in capacity. The experiments, conducted on two partially filled 190,000-L (50,000-gal) USTs at Griffiss Air Force Base in upstate New York during late August 1990, showed that a system's performance in large tanks depends primarily on the accuracy of the temperature compensation, which is inversely proportional to the volume of product in the tank. Errors in temperature compensation that were negligible in tests in small tanks were important in large tanks. The experiments further suggest that a multiple-test strategy is also required.

Keywords: *Underground storage, *Storage tanks, *Leakage, *Volumetric analysis, *Land pollution abatement, Performance standards, Pollution regulations, Crude oil, Materials tests, Standards compliance, Temperature, Petroleum products.

PB91-227975/REB PC **A04**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Guides to Pollution Prevention: The Automotive Repair Industry. Manual.
Jacobs Engineering Group, Inc., Pasadena, CA.
Oct 91, 52p EPA/625/7-91/013
Contract EPA-68-D8-0112
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Automotive maintenance and repair shops generate a variety of waste streams during activities such as replacing fluids (e.g., motor oil, radiator coolant, transmission fluid, brake fluid), replacing non-repairable parts (e.g., brake shoes/pads, shocks, batteries, belts, mufflers, electrical components, water pumps) and repairing fixable parts (e.g., brake calipers/rotors/drums, alternators, fuel pumps, carburetors, power train components). Of small quantity generators of hazardous waste in the nation, the automotive repair industry leads in number of generators and in quantity of total waste produced. Many opportunities exist to reduce the oils, sludges, and solvent and aqueous cleaning wastes that are generated. The guide describes the typical waste generating processes of the industry as well as source reduction and/or recycling options for each.

Keywords: *Automobiles, *Hazardous materials, *Pollution control, Maintenance, Batteries, Brake shoes, Belts, Brake fluids, Reduction, Guidelines, Regulations, Waste minimization, Auto repair shops.

PB91-228015/REB PC **A02**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Solvent Extraction Treatment. Engineering bulletin.
Science Applications International Corp., Cincinnati, OH.
Sep 90, 10p EPA/540/2-90/013
Contract EPA-68-C8-0062
Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

Solvent extraction does not destroy wastes, but is a means of separating hazardous contaminants from soils, sludges, and sediments, thereby reducing the volume of the hazardous waste that must be treated. Generally it is used as one in a series of unit operations, and can reduce the overall cost for managing a particular site. It is applicable to organic wastes and is generally not used for treating inorganics and metals. The technology uses an organic chemical as a solvent and differs from soil washing, which generally uses water or water with wash improving additives. During 1989, the technology was one of the selected remedies at six Superfund sites. Commercial-scale units are in operation. There is no clear solvent extraction technology leader by virtue of the solvent employed, type of equipment used, or mode of operation. The final determination of the lowest cost alternative will be more site specific than process equipment dominated. Vendors should be contacted to determine the availability of a unit for a particular site. The bulletin provides information on the technology applicability, the types of residuals produced, the latest performance data, site requirements, the status of the technology, and sources for further information.

Keywords: *Solvent extraction, *Hazardous materials, *Waste treatment, *Materials recovery, *Organic compounds, Volume, Cost analysis, Organic solvents, Remedial action, Technology utilization, Performance evaluation, Superfund, Research and development.

PB91-228023/REB PC **A02**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Mobile/Transportable Incineration Treatment. Engineering bulletin.
Science Applications International Corp., Cincinnati, OH.
Sep 90, 10p EPA/540/2-90/014
Contract EPA-68-C8-0062
Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

Incineration treats organic contaminants in solids and liquids by subjecting them to temperatures typically greater than 1000F in the presence of oxygen, which causes the volatilization, combustion, and destruction of these compounds. The bulletin describes mobile/transportable incineration systems that can be moved to and subsequently removed from Superfund and other hazardous waste sites. It does not address other thermal processes that operate at lower temperatures or those that operate at very high temperatures, such as plasma arc. It is applicable to a wide range of organic wastes and is generally not used treating inorganics and metals. Mobile/transportable incinerators exhibit essentially the same environmental performance as their stationary counterparts. To date, 49 of the 95 records of decision (RODs) designating thermal remedies at Superfund sites have selected onsite incineration as an integral part of a preferred treatment alternative. There are 22 commercial-scale units in operation. The bulletin provides the latest performance data, site requirements, the status of the technology, and where to go for further information.

Keywords: *Incineration, *Portable equipment, *Hazardous materials, *Waste treatment, *Organic compounds, Waste disposal, Superfund, Performance evaluation, Technology utilization, Solid waste disposal, Liquid waste disposal, Record of Decision.

PB91-228031/REB PC **A02**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Chemical Dehalogenation Treatment: APEG Treatment. Engineering bulletin.
Science Applications International Corp., Cincinnati, OH.
Sep 90, 8p EPA/540/2-90/015
Contract EPA-68-C8-0062

Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

The chemical dehalogenation system discussed in the report is alkaline metal hydroxide/polyethylene glycol (APEG) which is applicable to aromatic halogenated compounds. The metal hydroxide that has been most widely used for this reagent preparation is potassium hydroxide (KOH) in conjunction with polyethylene glycol (PEG) (typically, average molecular weight of 400 Daltons) to form a polymeric alkoxide referred to as KPEG. However, sodium hydroxide has also been used in the past and most likely will find increasing use in the future because of patent applications that have been filed for modification to this technology. This new approach will expand the technology's applicability and efficacy and should reduce chemical costs by facilitating the use of less costly sodium hydroxide. A variation of this reagent is the use of potassium hydroxide or sodium hydroxide/tetraethylene glycol, referred to as ATEG, that is more effective on halogenated aliphatic compounds. In some KPEG reagent formulations, dimethyl sulfoxide (DMSO) is added to enhance reaction rate kinetics, presumably by improving rates of extraction of the haloaromatic contaminants. Previously developed dehalogenation reagents involved dispersion of metallic sodium in oil or the use of highly reactive organosodium compounds. The reactivity of metallic sodium and these other reagents with water presented a serious limitation to treating many waste matrices; therefore, these other reagents are not discussed in this bulletin and are not considered APEG processes.

Keywords: *Waste treatment, *Dehalogenation, *Aromatic compounds, *Halogen organic compounds, Technology utilization, Revisions, Reaction kinetics, Chemical reactions, Metal compounds, Hydroxides, Cost analysis, Potassium hydroxides, *Chemical treatment, Alkaline metal hydroxide/polyethylene glycol.

PB91-228049/REB PC **A02/MF A01**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Slurry Biodegradation. Engineering bulletin.
Science Applications International Corp., Cincinnati, OH.
Sep 90, 10p EPA/540/2-90/016
Contract EPA-68-C8-0062
Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

In a slurry biodegradation system, an aqueous slurry is created by combining soil or sludge with water. This slurry is then biodegraded aerobically using a self-contained reactor or in a lined lagoon. Thus, slurry biodegradation can be compared to an activated sludge process or an aerated lagoon, depending on the case. There are two main objectives for using the technology: to destroy the organic contaminant and, equally important, to reduce the volume of contaminated material. Slurry biodegradation can be the sole treatment technology in a complete cleanup system, or it can be used in conjunction with other biological, chemical, and physical treatment. It may be demonstrated in the Superfund Innovative Technology Evaluation (SITE) program. Commercial-scale units are in operation. Vendors should be contacted to determine the availability of a unit for a particular site. The bulletin provides information on the technology applicability, the types of residuals produced, the latest performance data, site requirements, the status of the technology, and sources for further information.

Keywords: *Hazardous materials, *Biodeterioration, *Waste treatment, *Slurries, Aerobic processes, Remedial action, Technology utilization, Superfund, Performance evaluation, Sludge disposal, Biotechnology, Volume, *Soil treatment.

PB91-228056/REB PC **A03/MF A01**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Soil Washing Treatment. Engineering bulletin.
Science Applications International Corp., Cincinnati, OH.
Sep 90, 13p EPA/540/2-90/017
Contract EPA-68-C8-0062
Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

Soil washing is a water-based process for mechanically scrubbing soils ex-situ to remove undesirable contaminants. The process removes contaminants from soils in one of two ways: by dissolving or suspending them in the wash solution (which is later treated by conventional wastewater treatment methods) or by concentrating them into a smaller volume of soil through simple particle size separation techniques (similar to those used in sand and gravel operations). Soil washing systems incorporating both removal techniques offer the greatest promise for application to soils contaminated with a wide variety of heavy metal and organic contaminants. The concept of reducing soil contamination through the use of particle size separation is based on the finding that most organic and inorganic contaminants tend to bind, either chemically or physically, to clay and silt soil particles. At the present time, soil washing is used extensively in Europe and has had limited use in the United States. During 1986-1989, the technology was one of the selected source control remedies at eight Superfund sites. The bulletin provides information on the technology applicability, the types of residuals resulting from the use of the technology, the latest performance data, site requirements, the status of the technology, and where to go for further information.

Keywords: *Soil treatment, *Washing, *Waste management, Land pollution control, Remedial action, Soil contamination, Separation techniques, Superfund, Performance evaluation, Technology utilization, *Soil washing.

PB91-228064/REB PC **A02/MF A01**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
In situ Steam Extraction Treatment. Engineering bulletin.
Science Applications International Corp., Cincinnati, OH.
May 91, 9p EPA/540/2-91/005
Contract EPA-68-C8-0062
Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

In situ steam extraction removes volatile and semivolatile hazardous contaminants from soil and groundwater without excavation of the hazardous waste. Waste constituents are removed in situ by the technology and are not actually treated. The use of steam enhances the stripping of volatile contaminants from soil and can be used to displace contaminated groundwater under some conditions. The resultant condensed liquid contaminants can be recycled or treated prior to disposal. The steam extraction process is applicable to organic wastes but has not been used for removing insoluble inorganics and metals. Steam is injected into the ground to raise the soil temperature and drive off volatile contaminants. Alternatively, steam can be injected to form a displacement front by steam condensation to displace groundwater. The contaminated liquid and steam condensate are then collected for further treatment. Two types of systems are discussed in the document: the mobile system and the stationary system. The bulletin provides information on the technology applicability, limitations, a description of the technology, types of residuals produced, site requirements, the latest performance data, the status of the technology, and sources for further information.

Keywords: *Hazardous materials, *In-situ processing, *Water pollution control, *Ground water, *Soil treatment, *Extraction, Remedial action, Volatile organic compounds, Steam injection, Organic compounds, Waste treatment, Waste recycling, Land pollution control, Performance evaluation.

PB91-228072/REB PC **A03/MF A01**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
In situ Soil Vapor Extraction Treatment. Engineering bulletin.
Science Applications International Corp., Cincinnati, OH.
May 91, 12p EPA/540/2-91/006
Contract EPA-68-C8-0062
Prepared in cooperation with FW Energy Applications, Inc., Livingston, NJ. Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

Soil vapor extraction (SVE) is designed to physically remove volatile compounds, generally from the vadose or unsaturated zone. It is an in situ process employing vapor extraction wells alone or in combination with air injection wells. Vacuum blowers supply the motive force, inducing air flow through the soil matrix. The air strips the volatile compounds from the soil and carries them to the screened extraction well. Air emissions from the systems are typically controlled by adsorption of the volatiles onto activated carbon, thermal destruction (incineration or catalytic oxidation), or condensation by refrigeration. SVE is a developed technology that has been used in commercial operations for several years. The final determination of the lowest cost alternative will be more site-specific than process equipment dominated. The bulletin provides information on the technology applicability, the limitations of the technology, the technology description, the types of residuals produced, site requirements, the latest performance data, the status of the technology, and sources for further information.

Keywords: *Soil treatment, *Hazardous materials, *Air flow, *Extraction, *In-situ processing, Volatile organic compounds, Remedial action, Injection, Air pollution control, Soil gases, Performance evaluation, Superfund, Technology utilization, *Soil vapor extraction.

PB91-228080/REB PC **A02/MF A01**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Thermal Desorption Treatment. Engineering bulletin.
Science Applications International Corp., Cincinnati, OH.
D. Oberacker, P. Lafornara, and P. dePercin. May 91, 10p EPA/540/2-91/008
Contract EPA-68-C8-0062
Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

Thermal desorption is an ex situ means to physically separate volatile and some semivolatile contaminants from soil, sediments, sludges, and filter cakes. For wastes containing up to 10% organics or less, thermal desorption can be used alone for site remediation. It also may find applications in conjunction with other technologies or be appropriate to specific operable units at a site. Site-specific treatability studies may be necessary to document the applicability and performance of a thermal desorption system. Thermal desorption is applicable to organic wastes and generally is not used for treating metals and other inorganics. Depending on the specific thermal desorption vendor selected, the technology heats contaminated media between 200-1000 F, driving off water and volatile contaminants. Offgases may be burned in an afterburner, condensed to reduce the volume to be disposed, or captured by carbon adsorption beds. The bulletin provides information on the technology applicability, limitations, the types of residuals produced, the latest performance data, site requirements, the status of the technology, and sources for further information.

Keywords: *Waste treatment, *Hazardous materials, *Thermal environments, *Desorption, Organic compounds, Remedial action, Soil treatment, Performance evaluation, Air pollution control, Superfund, Afterburning, Technology utilization, Separation.

PB91-228114/REB PC **A06/MF A02**
Development of Risk Assessment Methodology for Municipal Sludge Incineration.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Oct 90, 110p EPA/600/6-91/004

This is one of a series of reports that present methodologies for assessing the potential risks to humans or other organisms from the disposal or reuse of municipal sludge. The sludge management practices addressed by the series include land application practices, distribution and marketing programs, landfilling, surface disposal, incineration and ocean disposal. In particular, these reports provide methods for evaluating potential health and environmental risks from toxic chemicals that may be present in sludge. The document addresses risks from chemicals associated with incineration of municipal sludge. These proposed risk assessment procedures are designed as tools to assist in the development of regulations for sludge management practices. The procedures are structured to allow calculation of technical criteria for sludge disposal/reuse options based on the potential for ad-

verse health or environmental impacts. The criteria may address management practices (such as site design or process control specifications), limits on sludge disposal rates or limits on toxic chemical concentrations in the sludge.

Keywords: *Risk assessment, *Sludge disposal, *Municipal wastes, *Incineration, *Waste management, *Public health, Waste disposal, Waste utilization, Environmental effects, Pollution regulations, Exposure, Humans, Environmental transport, Design criteria, Toxic substances.

PB91-228346/REB PC **A13**/MF **A03**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Handbook: Responding to Discharges of Sinking Hazardous Substances.
Science Applications International Corp., McLean, VA.
K. R. Boyer, V. E. Hodge, and R. S. Wetzel. Sep 87, 290p EPA/540/2-87/001 , , OERR-9355.0-32
Contract EPA-68-03-3113
Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response, and Coast Guard, Washington, DC.

The document provides guidance on the response to spills of chemicals that sink in water bodies and contaminate bottom materials. It describes the decision-making process associated with defining spill parameters and impacts and selecting appropriate response measures. It also describes the cleanup and mitigative technologies that may be used, including containment, removal, treatment, disposal, and in situ techniques. The document provides governmental and industrial technical personnel with the means to respond to bottom material contamination situations, whether for quick response or for long-term remediation.

Keywords: *Handbooks, *Hazardous materials spills, *Water pollution effects, *Bottom sediments, *Waste disposal, Chemical properties, Sediment-water interfaces, Path of pollutants, Remedial action, In-situ processing, Chemicals spills, Emergency planning, Dewatering, Waste treatment, Containment, Bodies of water, Long term effects, Environmental effects, Dredging, Substitutes, *Remedial response, Cleanup operations.

PB91-228353/REB PC **A03**/MF **A01**
Technical Support Services for Superfund Site Remediation. Interim Directory.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
R. G. Wilhelm. Feb 90, 34p* EPA/540/8-90/001, OERR-9380.1-09
Prepared in cooperation with Environmental Management Support, Silver Spring, MD.

The Directory highlights the significant OSWER and ORD technical assistance programs that have procedures in place to process requests such as answering a technical question, providing staff to work on a problem, or referring callers to the appropriate source.

Keywords: *Superfund, *Information transfer, *Remedial action, *Directories, *Waste management, *Technical assistance, Technology transfer, Research and development, Environmental monitoring, Risk assessment, Water pollution, Information systems, Environmental health, Toxic substances, Air pollution, Hazardous materials, Regional analysis, Chemical compounds, Office of Research and Development, Office of Solid Waste and Emergency Response, US EPA Regions 1-10.

PB91-228395/REB PC **A14**/MF **A03**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Inventory of Treatability Study Vendors. Volume 1.
PEI Associates, Inc., Arlington, VA.
Mar 90, 302p EPA/540/2-90/003A , , OERR-9380.3-03
Contract EPA-68-03-3413
Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

The document was developed to facilitate the performance of treatability studies by ensuring that requests for proposals (RFPs) for treatability studies are made available to the broadest subset of contractors who can perform such studies. The listing is not a pre-qualification of contractors and all RFPs must be done in accordance with the Federal Acquisitions Regulations. The information contained in the inventory has been organized into two volumes. Volume I provides listings of treatability study vendors organized by technology and contaminant groups. The intended users of the document are Superfund remedial project managers and contractors who are involved in a procurement process to obtain a treatability study. Volume II provides vendor specific information, i.e., permit status and scale of studies conducted. The information can be obtained by contacting the vendors identified in Volume I. Volume II is not available. Both Volume I and II are being updated.

Keywords: *Hazardous materials, *Remedial action, *Waste treatment, *Superfund, Technology utilization, Contractors, Administrative procedures, Substitutes, Tables(Data), Incineration, Thermal environments, Physical chemical treatment, Immobilization, Information transfer, Listings, Biological treatment, In-situ processing, Soil treatment, *Vendors.

PB91-228759/REB PC **A11**/MF **A03**
User's Guide to MOBILE4.1 (Mobile Source Emission Factor Model).
Environmental Protection Agency, Ann Arbor, MI. Test and Evaluation Branch.
Jul 91, 233p EPA-AA-TEB-91/01, EPA/SW/MT-91/098A
For system on magnetic tape, see PB91-509992. For system on diskette, see PB91-510008 and PB91-510016. Supersedes PB89-164271.

MOBILE4.1 is the latest revision to EPA's highway vehicle mobile source emission factor model. It will calculate emission factors for hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) for eight types of highway vehicles. EPA is requiring that States and others preparing emission inventories for nonattainment areas for CO and ozone to use MOBILE4.1 in the development of the base year 1990 emission inventories required under the Clean Air Act of 1990. Relative to MOBILE4, it contains numerous revisions and provides the user with additional options for modeling highway vehicle emission factors.

Keywords: *User manuals(Computer programs), *Mobile pollutant sources, *Emission factors, *Exhaust emissions, *Air pollution, *Computerized simulation, Documentation, Highway transportation, US EPA, Hydrocarbons, Carbon monoxide, Nitrogen oxides, Revisions, State government, *MOBILE model, Mobile Source Emission Factor Model, Emission inventories, Clean Air Act of 1990.

PB91-228791/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Environmental Criteria and Assessment Office.
REFEREE: Bibliographic Database Manager, Version 4. Documentation.
ManTech Environmental Technology, Inc., Research Triangle Park, NC.
D. Stout. 15 Jul 91, 44p EPA/SW/DK-91/096A
For system on diskette, see PB91-509794. Supersedes PB88-200787. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Environmental Criteria and Assessment Office.

The publication is the user's manual for 4.xx releases of REFEREE, a general-purpose bibliographic management program for IBM-compatible microcomputers. It presents installation requirements and instructions, a general overview of program capabilities, and instructions for each of the commands on the program's Main and Utilities menus.

Keywords: *Data base management, *Bibliographies, Libraries, File management systems, Records management, Utility routines, Format, User manuals(Computer programs), Documentation.

PB91-228809/REB PC **A09**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Handbook: Control Technologies for Hazardous Air Pollutants. Technical rept.
Pacific Environmental Services, Inc., Durham, NC.
R. Y. Purcell, and G. S. Shareef. Sep 86, 192p EPA/625/6-86/014
See also Volume 1, PB86-167020 and Volume 2, PB86-167038. Prepared in cooperation with Radian Corp., Research Triangle Park, NC. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The handbook was prepared to provide a methodology for determining the performance and cost of air pollution control techniques used to reduce the emissions of hazardous air pollutants from commercial/industrial sources. Various control techniques that may be applicable to different sources are identified and calculational procedures and blank work sheets are provided to guide users through the appropriate application of these techniques. The handbook is not intended to provide design requirements in the detail necessary to achieve compliance with regulations applicable to a given source. The handbook is a condensation of a more extensive two volume work prepared by EPA's Air and Energy Engineering Research Lab. These volumes are also available from NTIS as order numbers PB86-167020 (Vol. 1) and PB86-1677038 (Vol. 2).

Keywords: *Air pollution control, *Hazardous materials, *Air pollution control equipment, *Toxic substances, Handbooks, Cost estimates, Physical properties, Incineration, Boilers, Pollution sources, Design criteria, Performance evaluation, Adsorption, Condensation, Fabric filters, Electrostatic precipitators, Venturi scrubbers, Emission factors.

PB91-230151/REB PC **A06**/MF **A02**
Environmental Protection Agency, Washington, DC. Office of Marine and Estuarine Protection.
Environmental Inventory of the Christmas Bay Coastal Preserve. Final rept.
Galveston Bay National Estuary Program,, Austin, TX.
R. W. McFarlane. Mar 91, 105p GBNEP-7
Contract EPA-CE-006551
Sponsored by Environmental Protection Agency, Washington, DC. Office of Marine and Estuarine Protection.

An Environmental Inventory of Christmas Bay designed to assist in the development of a management plan for the preserve. The objective of the report was to gather and integrate existing data, identify data gaps, and describe the environmental attributes of Christmas Bay. The report concludes that: one or more water quality monitoring stations should be established; studies should be undertaken to determine the relative abundance of four species of seagrass; a vegetated island of adequate elevation would be a valuable resource for colonial wasing brids and wildlife refuge.

Keywords: *Environmental surveys, *Natural resources management, *Water pollution, Environment management, Data processing, Water quality, Water pollution sampling, Christmas Bay, Freshwater-saline water, Wildlife management, Habitats, Sea grasses, Inflow, Hydrology, Texas, *Christmas Bay Coastal Preserve, Galveston Bay National Estuary Program, Armand Bayou Coastal Preserve.

PB91-230185/REB PC **A06**/MF **A02**
Environmental Protection Agency, Washington, DC.
Regulatory Survey for the Christmas Bay Coastal Preserve. Final rept.
Galveston Bay National Estuary Program,, Austin, TX.
C. Masterson. Mar 91, 106p GBNEP-9
Sponsored by Environmental Protection Agency, Washington, DC.

A Regulatory Survey of the Christmas Bay Coastal Preserve that serves as the basis for identifying appropriate regulatory actions to address the environmental management needs of the preserve. The purpose of the study is to describe the array of regulatory programs which govern the management of the preserve and identify gaps, overlaps, and interagency coordination issues. The report outlines opportunities to improve management of the Armand Bayou Coastal Preserve.

Keywords: *Environment management, *Pollution regulations, *Natural resources management, *Public health, *Water pollution, Christmas Bay, Legislature, Administrative procedures, Interagency cooperation, Law enforcement, Industrial wastes, Texas, Habitats, Wildlife management, Point sources, Nonpoint sources, Wetlands, Watersheds, Sewage disposal, *Christmas Bay Coastal Preserve, Galveston Bay Na-

tional Estuary Program, Armand Bayou Coastal Preserve.

PB91-230300/REB PC **A06**/MF **A02**
Environmental Protection Agency, Washington, DC.
Regulatory Survey for the Armed Bayou Coastal Preserve. Final rept.
Galveston Bay National Estuary Program,, Austin, TX.
C. Masterson. Mar 91, 106p GBNEP-10
Sponsored by Environmental Protection Agency, Washington, DC.

A Regulatory Survey of the Armand Bayou Coastal Preserve that serves as the basis for identifying appropriate regulatory actions to address the Environmental Management needs of the preserve. The purpose of the study is to describe the array of regulatory programs which govern the management of the preserve and identify gaps, overlaps and interagency coordination issues. The report outlines opportunities to improve the management of the Armand Bayou Coastal Preserve.

Keywords: *Environment management, *Pollution regulations, *Natural resources management, *Water pollution, *Public health, Interagency cooperation, Legislature, Administrative procedures, Law enforcement, Texas, Industrial wastes, Sewage disposal, Habitats, Wildlife management, Point sources, Nonpoint sources, Wetlands, Watersheds, *Armand Bayou Coastal Preserve, Galveston Bay National Estuary Program.

PB91-230979/REB PC **A05**/MF **A01**
Environmental Protection Agency, Washington, DC.
Environmental Inventory of the Armand Bayou Coastal Preserve. Final rept.
Galveston Bay National Estuary Program,, Austin, TX.
R. W. McFarlane. Mar 91, 76p GBNEP-8
Sponsored by Environmental Protection Agency, Washington, DC.

An Environmental Inventory of the Armand Bayou designed to assist in the development of a management plan for the preserve. The objective of the report was to gather and integrate existing data, identify data gaps, and describe the environmental attributes of the Armand Bayou. The report concludes that: establishment of an additional monitoring station that will reflect the contribution of pollutants from Horsepen Bayou is needed; an investigation of toxicants in water and sediment samples should be conducted; investigations of the commercial and recreational uses of Mud Lake should be undertaken.

Keywords: *Natural resources management, *Environmental surveys, *Water pollution, Environment management, Water pollution sampling, Data processing, Watersheds, Mud Lake, Meteorology, Inflow, Freshwater-saline water, Hydrology, Water quality, Galveston Bay, Wildlife management, Habitats, Texas, *Armand Bayou Coastal Preserve, Galveston Bay National Estuary Program.

PB91-231068/REB PC **A03**/MF **A01**
EPA's Research to Improve Health Risk Assessments Program: Overview and Water-Related Research.
Health Effects Research Lab., Research Triangle Park, NC.
J. J. Vandenberg, J. R. Fowler, and H. Zenick. 1991, 13p EPA/600/D-91/187

Federal law requires the Environmental Protection Agency (EPA) to assess drinking water risks and to set standards to insure a safe drinking water supply. Given limited data, risk assessors rely on high dose experimental data, results from occupational health studies, and other data sets (e.g., in vitro tests) to make predictions about health outcomes. A variety of assumptions and extrapolations must be used to estimate from the results of these studies the likelihood of adverse health effects associated with a lifetime of water consumption. In recognition that the uncertainties in risk assessment may result in economic burdens (i.e., from over regulation) or inadequate public safety (i.e., from under regulation), EPA has established the Research to Improve Health Risk Assessments (RIHRA) program to resolve some of the major health risk assessment issues. The paper presents an overview of the RIHRA program and several examples of health research applicable to drinking water issues.

Keywords: *Risk assessment, *Potable water, *Water pollution effects(Humans), *Water pollution standards, Dose-response relationships, Dose limits, Occupational safety and health, Public health, Pollution laws, US EPA, Exposure, Biological effects, Probability theory, Physiology, Mathematical models, *Research to Improve Health Risk Assessments Program, Pharmacokinetics.

PB91-231076/REB PC **A03**/MF **A01**
Animal Models of Cognitive Development in Neurotoxicology. Book chapter.
Health Effects Research Lab., Research Triangle Park, NC.
M. E. Stanton. 1991, 49p EPA/600/D-91/188

The thesis of the chapter has been that spatial delayed alternation versus position discrimination learning can serve as a valuable rodent model of cognitive development in neurotoxicology. The model captures dual-process conceptualizations of memory in human neuropsychology and involves procedures that are operationally very similar to those that have been used to address these conceptualizations in human and nonhuman primates. The model also captures the developmental profile and, at least in a general way, common neural mechanisms of cognitive development in human and nonhuman primates. Finally, the model reveals effects of heavy metals on cognitive development that would have been predicted from knowledge of the neuroanatomical effects of developmental exposure to these compounds. In addition, some of the work reveals properties of developmental neurotoxicity that resemble those claimed for environmental lead (Davis, 1990). In sum, the model system fulfills in a general way the criteria for animal models proposed earlier (and by investigators of other neurobehavioral disorders, Bartus & Dean, 1987; Solomon & Pendlebury, 1988).

Keywords: *Toxicology, *Nervous system, *Cognition, *Animal disease models, *Toxic substances, Metals, Brain, Behavior, Neuropsychological tests, Ontogenesis, Memory, Reprints.

PB91-231084/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC.
Analysis of Arachidonic Acid Metabolites and Platelet Activating Factor Production.
North Carolina Univ. at Chapel Hill.
M. Madden, J. Samet, H. Koren, and M. Friedman. Jun 91, 36p EPA/600/D-91/190
Grant EPA-R-812738
Sponsored by Environmental Protection Agency, Research Triangle Park, NC.

Metabolites of arachidonic acid (eicosanoids) and platelet activating factor are important bioactive lipids that may be involved in the pathobiological alterations in animals induced by pollutant exposure. Analysis of these substances in biological tissue and fluids is important for determining their role in these processes. The manuscript describes and reviews some of the analytical techniques available for quantitation of these lipids. The described assays include use of high performance lipid chromatography, thin layer chromatography, radioimmunoassay, and enzyme-linked immunoassay.

Keywords: *Arachidonic acids, *Eicosanoids, *Platelet activating factor, *Biochemistry, Biosynthesis, High pressure liquid chromatography, Thin layer chromatography, Radioimmunoassay, Pollutants, Enzyme-linked immunosorbent assay, Chemical analysis, Tissue culture, Cultured cells.

PB91-231092/REB PC **A02**/MF **A01**
Neurotoxicant 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) Alters Immune Function When Given in Combination with Diethyldithiocarbamate (DDC).
Health Effects Research Lab., Research Triangle Park, NC.
D. B. Miller, R. W. Luebke, J. Reinhard, and J. P. O'Callaghan. 1991, 7p EPA/600/D-91/191
Prepared in cooperation with Wellcome Research Labs., Research Triangle Park, NC.

The T-cell suppression induced by the dopaminergic neurotoxicant, 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) can be reversed if treatment is preceeded by low dosages of diethyldithocarbamate (DDC). However, if the dosage of DDC is high enough to potentiate the neurotoxicity associated with MPTP, thymic and spleen involution occur suggesting this dosing regimen may impair immune function. Thus, the immunotoxic and neurotoxic effects of the high dose regimen were studied.

Keywords: *Toxicity, *Nervous system, *Diethyldithiocarbamate, *Immune system, Dose-response relationships, Drug synergism, Spleen, Thymus gland, Tyrosine hydroxylase, Organ weight, Concanavalin A, Phytohemagglutinins, *Methylphenyltetrahydropyridine.

PB91-231100/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Comparison of an Alternative Land Surface Parameterization with the GFDL High Resolution Climate Model. Symposium paper.
Princeton Univ., NJ. Water Resources Program.
E. F. Wood, D. P. Lettenmaier, and J. R. Wallis. 1991, 14p EPA/600/D-91/192
Pub. in Chapter in International Union of Geophysics and Geology, 1991. Prepared in cooperation with Washington Univ., Seattle. Dept. of Civil Engineering, and IBM Thomas J. Watson Research Center, Yorktown Heights, NY. Sponsored by Corvallis Environmental Research Lab., OR.

The hydrologic performance of a five-year GFDL R30 simulation is evaluated using observed temperature, precipitation, and runoff for the continental U.S.. While the model reproduces the major east-west structure of seasonal variations in the temperature and precipitation, it is too cold and wet in the winter, and warm and dry in the summer, and has too little runoff, for much of the continental U.S. As an alternative to the bucket hydrology used in the GFDL (and most other) GCM's, the performance of a model that represents variations in infiltration capacity within a GCM grid, as well as baseflow, was evaluated. Comparisons were made with GFDL and GISS bucket hydrology using five years of daily GFDL R30-simulated precipitation and temperature for a southeastern U.S. grid cell. More dynamic and apparently realistic short-term variations in soil moisture were achieved for the alternative hydrologic model, but the most significant differences in the hydrologic dynamics were attributable to the inclusion of baseflow to simulate between-storm runoff.

Keywords: *Hydrology, *Climates, *Land resources, *Soil water, *Computerized simulation, Air water interactions, General circulation models, Regional analysis, Precipitation(Meteorology), Atmospheric temperature, Seasonal variation, Climatic changes, Runoff, Evaporation, Hydrometeorology, Water balance, Comparison.

PB91-231118/REB PC **A03**/MF **A01**
Microbial Aspects of Water Treatment Processes: A Progress Report.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
E. E. Geldreich, B. W. Lykins, and R. M. Clark. 1991, 24p EPA/600/D-91/193

Modifications in water treatment processes or in their sequential placement to optimize reductions in disinfection by-product formation must be cautiously evaluated and monitored for their impact on microbial barriers. Four major treatment concepts were investigated either in pilot plant or full scale: (1) changing the point of application for free chlorine disinfection, (2) applying granular activated carbon (GAC) adsorption for organic removal, (3) ozonation and biological activated carbon (BAC) for increased organic conversions and (4) selection of alternative disinfectants. In the trade-off to minimize trihalomethane production, however, some migration deeper into the treatment train will occur as a result of fluctuating qualities in many surface source waters. None of these issues are beyond control using reasonable treatment precautions by water plant operators. What is needed is a revised monitoring program for water treatment practices that will provide more useful information to fine tune treatment effectiveness.

Keywords: *Water treatment, *Microbial degradation, *Potable water, *Environmental monitoring, Water pollution control, Disinfection, Granular activated carbon treatment, Adsorption, Biological treatment, Ozonation, Halomethanes, Filtration, Byproducts, Tables(Data), Reprints.

PB91-231126/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Test Methods for the Determination of Volatile Organic Compounds in Consumer Products.
Radian Corp., Research Triangle Park, NC.
M. Kosusko, J. T. Bursey, R. G. Merrill, T. P. Heil, and F. DeMartin. 1991, 18p EPA/600/D-91/194
Contract EPA-68-02-4286
Presented at the Annual Meeting, Air and Waste Management Association (84th), Vancouver, B.C., June 16-21, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses two test methods for determining volatile organic compounds (VOCs) in consumer products. Candidate methodologies were selected from non-consumer product applications, and preliminary laboratory work was performed to evaluate the feasibility of two of the candidate methods which were based on gas chromatographic and gravimetric methods. The selected methodology avoids identification and quantitation of specific compounds to protect the confidentiality of product formulations. The resulting methodology must be accurate, reproducible, easy to use, and as efficient and low in cost as possible.

Keywords: *Volatile organic compounds, *Gas chromatography, *Gravimetric analysis, *Consumer products, Air pollution, Air pollution control, Feasibility, Chemical analysis, Laboratory tests, Stationary sources.

PB91-231134/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Catalog of Materials as Potential Sources of Indoor Air Pollution.
Radian Corp., Research Triangle Park, NC.
M. B. Stockton, J. S. McLean, J. B. White, and M. D. Jackson. 1991, 14p EPA/600/D-91/195
Contract EPA-68-02-4286
Presented at American Society of Heating, Refrigerating and Air-Conditioning Engineers Healthy Building Conference, Washington, DC., September 4-8, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses a series of documents being developed by the U.S. EPA, summarizing available information on building materials and products brought into homes and office buildings as potential sources of indoor air pollution. The documents will provide a complete list of materials as potential indoor air pollution sources and, where data are available, each source's relative importance for further research, and basic information for architects, building contractors, and homeowners to use in making informed decisions about materials and their potential impact on indoor air quality. Little effort has been made to systematically identify potential indoor air pollution sources and summarize and evaluate existing relevant data. The EPA effort addresses that need.

Keywords: *Indoor air pollution, *Consumer products, *Building materials, *Catalogs, *Air pollution control, Furniture, Cleaning agents, Office equipment, Household goods, Household fabrics, Residential buildings, Office buildings, Stationary sources, Air quality, US EPA, Pollution sources.

PB91-231142/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Degreasing System Pollution Prevention Modification verses Industrial Hygiene Concerns. Rept. for Nov 89-Sep 90.
Air Force Engineering and Services Center, Tyndall AFB, FL.
C. H. Darvin, and J. D. Wander. 1990, 12p EPA/600/D-91/196
Contract EPA-68-02-4284
Presented at Annual Army Environmental R and D Symposium (15th), Williamsburg, VA., June 25-27, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper describes using a vapor degreaser at Wright-Patterson AFB to evaluate various modifications to reduce 1,1,1-trichloroethane (TCA) emissions. The modifications included freeboard extension, refrigeratedchiller, lip vent removal, covers, and combinations of each. The evaluation was aimed at maintaining a safe industrial hygiene environment. The lip vent, installed to maintain the breathing zone concentration of solvent at below the OSHA PEL (permissible exposure limit), also enhanced the discharge of solvent to the atmosphere. The solvent concentration of the discharge duct averaged 300 ppm solvent during normal operation. Freeboard extension reduced emissions by up to 50%, but at the expense of increased breathing zone concentration when the lip vent was off. Using extended freeboard combined with a below-zero freeboard chiller reduced the discharge of solvent by more than 75%, while keeping the breathing zone solvent concentration at 10 ppm and below, although the freeboard fan was turned off. Study results show that both industrial hygiene and air pollution concerns can be satisfied with proper engineering and operation of the degreasing system. The involved degreaser was a 26 sq ft (2.4 sq m), open-top vapor system. Approximately 93,000 lb (42,222 kg) of TCA solvent is used each year in the system. Premodification breathing zone solvent concentration averaged 10 ppm.

Keywords: *Air pollution control, *Chloroethanes, *Vapor degreasing, *Organic solvents, *Technology assessment, Industrial hygiene, Occupational exposure, Stationary sources, Indoor air pollution, *1,1,1-Trichloroethane, *Wright Patterson Air Force Base.

PB91-231159/REB PC **A03**/MF **A01**
Developmental Toxicity Testing. Book chapter.
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.
C. A. Kimmel, and C. J. Price. Nov 90, 19p EPA/600/D-91/197, OHEA-R-375
Prepared in cooperation with Research Triangle Inst., Research Triangle Park, NC.

Contemporary developmental toxicity testing focuses on the evaluation of a variety of adverse developmental effects which include structural malformations, intrauterine death, growth retardation, and deficits in postnatal function. In the extrapolation of information from animal studies to humans, the most sensitive end point (i.e., the effect detected at the lowest dose) is used to establish the no observed adverse effect level (NOAEL). The approach is based on the assumption that a developmental effect seen in animal studies is predictive of a developmental effect in humans, but that the manifestation of the effect may vary from species to species. The testing procedures used also include an evaluation of maternal toxicity, which is important for determining that the proper dose levels have been tested. Many chemicals produce developmental effects at or near a dose that also produces minimal maternal toxicity. Developmental effects at maternally toxic levels are of concern since exposures may occur accidentally or intentionally. Doses below those causing maternal toxicity must also be tested, since developmental effects at these levels are of greatest concern. Finally, the lowest dose tested should establish NOAELs for maternal and developmental toxicity. In some cases, it may be possible to use the lowest observed adverse effect level (LOAEL), especially if the effect at this dose is near the limits of detection.

Keywords: *Toxicity, *Teratogens, Fetal growth retardation, Child development disorders, Species specificity, Fetal death, Growth abnormalities, Dose-response relationships, Exposure, Test methods, Animal husbandry, Mothers, Fetus, Reprints.

PB91-231167/REB PC **A02**/MF **A01**
Current Corrosion By-Products and Corrosion Control Research.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
M. R. Schock. 1990, 9p EPA/600/D-91/198
Pub. in American Water Works Association Seminar Proceedings, 'Current Research Activities in Support of USEPA's Regulatory Agenda', Cincinnati, OH., June 17, 1990, p125-131.

US EPA research in the area of corrosion control consists of a combination of in-house research and extramural projects. The extramural projects have recently addressed the corrosion of solder in some Long Island water supplies, impacts of municipal ion-exchange softening on corrosion, developing an internal corrosivity protocol, and corrosion control in very soft, acidic, low-carbonate waters. In-house research focuses on corrosion inhibitor mechanisms, solubility of metals in drinking water, and natural corrosion deposits.

Keywords: *Corrosion prevention, *Corrosion, *Water pollution abatement, *Potable water, *Research and development, Byproducts, Corrosion inhibitors, Distribution systems, Metals, Water supply, Solubility, pH, US EPA, Reprints.

PB91-231175/REB PC **A03**/MF **A01**
Inactivation of Microorganisms.
Environmental Protection Agency, Cincinnati, OH. Microbiological Treatment Branch.
E. W. Rice. 1991, 11p EPA/600/D-91/199
Pub. in Jnl. American Water Works Association Seminar Proceedings of Annual Conference, Cincinnati, OH., June 17, 1990, p51-59. Presented at the Annual AWWA Conference, Cincinnati, OH., June 17-21, 1990.

The primary goal of the disinfection process in drinking water treatment is the inactivation of microbial pathogens, which serve as the etiological agents of waterborne disease. The disinfection of water to be used for public consumption was first initiated in the early part of the century. There have been few developments in the area of public health which have been more effective in controlling the spread of infectious diseases. While other unit processes may dramatically reduce the number of microorganisms, disinfection serves as the final and in some cases the only barrier to the entry of microbial pathogens into the finished product water. Studies dealing with the disinfection process in drinking water treatment are an integral part of the research efforts of the U.S. Environmental Protection Agency (U.S. EPA). The manuscript summarizes recent research regarding the inactivation of microbial agents by a variety of chemical disinfectants.

Keywords: *Water microbiology, *Water treatment chemicals, *Potable water, Disinfection, Infectious diseases, Disease outbreaks, Giardia lamblia, Cryptosporidium, Coliform bacteria.

PB91-231183/REB PC **A02**/MF **A01**
Longterm Stability of Solidified Waste as Determined by Physical and Morphological Parameters.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
W. E. Grube. c1990, 10p EPA/600/D-91/200
Pub. in Contaminated Soil, p1289-1296 1990.

Three soil materials contaminated with oil, grease, PCB's and metals were stabilized by batch-mixing with portland cement and proprietary additives. Evaluation of this process included attention to physical properties and features visible to the eye and several levels of magnification. Intact cyclindrical samples were examined by X-ray photograph, compressional wave velocity, and petrographic methods; and subjected to strength and permeability tests. The treated wastes had satisfactory strength, resistance to weathering forces, and very low permeability. Waste components were uniformly distributed through the solidified mass. Stability of large masses of solidified waste was evaluated by examination about 1-meter in all dimensions. (Copyright (c) 1990 Kluwer Academic Publishers.)

Keywords: *Stabilization, *Solidification, *Waste forms, *Hazardous materials, *Waste disposal, Long term effects, Cements, Additives, Physical properties, Morphology, Oils, Greases, Polychlorinated biphenyls, Metals, Reprints, *Soliditech process.

PB91-231191/REB PC **A02**/MF **A01**
Cost Estimating Systems for Remedial Action Projects.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
G. M. Evans, and J. Peterson. 1991, 6p EPA/600/D-91/201
Prepared in cooperation with Corps of Engineers, Omaha, NE. Missouri River Div.

The paper details the ongoing collaboration between the U.S. EPA and the U.S. Army Corps of Engineers in the development of complementary microcomputer based cost estimating systems for hazardous waste remediations. The U.S. EPA system, 'Remedial Action Cost Estimating System' (RACES), is a technology based application. Estimates generated by RACES are based upon cost engineering relationships. The esti-

mates are designed for use in the early stages of remediation design. The U.S. Army Corps of Engineers system, 'Micro-Computer Aided Cost Engineering System' (M-CACES), is a 'bottoms-up' system for use in situations where detailed design information is available. While both systems will stand alone, they have been designed to allow the transfer of estimates generated by RACES directly into the M-CACES system.

Keywords: *Remedial action, *Cost estimates, *Hazardous materials, *Waste management, *Superfund, US EPA, Corps of Engineers, Military facilities, Computer aided design, Construction, Management planning, Reprints, *Remedial Action Cost Estimating System, *Micro-Computer Aided Cost Engineering System, Remedial design.

PB91-231209/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
EPA's Mobile Volume Reduction Unit for Soil Washing. Conference paper.
Foster Wheeler Enviresponse, Inc., Livingston, NJ.
H. Masters, and B. Rubin. 1991, 18p EPA/600/D-91/202
Contract EPA-68-C9-0033
Presented at Superfund '90 HMCRI Annual National Conference and Exhibition (11th), Washington, DC., November 26-29, 1991, p89-104. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The paper discusses the design and initial operation of the U.S. Environmental Protection Agency's (EPA) Mobile Volume Reduction Unit (VRU) for soil washing. Soil washing removes contaminants from soils by dissolving or suspending them in the wash solutions (which can be later treated by conventional waste water treatment methods) or by volume reduction through simple particle size separation techniques. Contaminants are primarily concentrated in the fine-grained (<0.063 mm, 0.0025) inch soil fraction. The VRU is a pilot-scale mobile system for washing soil contaminated with a wide variety of heavy metal and organic contaminants. The unit includes state-of-the-art washing equipment for field applications.

Keywords: *Mobile equipment, *Soil treatment, *Land pollution control, *Hazardous materials, Remedial action, Soil contamination, Field tests, State of the art, Heavy metals, Extraction, Waste disposal, Chemical spills, Hazardous materials spills, Reprints, *Soil washing.

PB91-231217/REB PC **A03**/MF **A01**
Assimilable Organic Carbon and Distribution System Quality.
Environmental Protection Agency, Cincinnati, OH. Microbiological Treatment Branch.
D. J. Reasoner. 1991, 14p EPA/600/D-91/203
Pub. in Jnl. American Water Works Association Seminar Proceedings of the AWWA Annual Conference, Cincinnati, OH., June 17-21, 1990, p61-72. Presented at the AWWA Annual Conference and Exposition Sunday Seminar (S 11) 'Current Research Activities in Support of U.S. EPA's Regulatory Agenda', Cincinnati, OH., June 17, 1990.

The biological stability of treated drinking water is important to the U.S.E.P.A. and to water utilities because of concern for compliance with the coliform MCL. The level of assimilable organic carbon (AOC) in water is affected by water treatment. Treatment processes such as ozonation that increase the level of AOC, combined with lowered disinfectant residual to reduce disinfectant by-product formation, may result in increased bacterial growth in the distribution system. Information is needed on factors that impact AOC measurement and interpretation, and on strategies to control microbial growth in response to AOC.

Keywords: *Potable water, *Water quality, *Carbon, Ozone, Water treatment, Disinfection, Water microbiology, Coliform bacteria, Microbial colony count.

PB91-231225/REB PC **A01**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Role of Oxidants in Influenza-Induced Airway Hyperreactivity in Rats.
ManTech Environmental Technology, Inc., Research Triangle Park, NC.
J. S. Tepper, J. R. Lehmann, J. R. Hoidal, D. L. Costa, and G. R. Burleson. 1991, 5p EPA/600/D-91/204
Contract EPA-68-02-4450
Prepared in cooperation with Utah Univ., Salt Lake City, and McGuire Clinic, Richmond, VA. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

Airway hyperreactivity (AHR) to intravenous acetylcholine has been demonstrated 3d after F-344 rats were intranasally instilled with a rat-adapted influenza virus (ARRD, A657:1990). N-acetyl cysteine (NAC), an oxidant scavenger, was able to block AHR if orally administered (1% in tap water) for 2d prior to virus infection and continued for 3d until AHR was examined. To evaluate if these oxygen radicals derived from altered adenosine metabolism were responsible for AHR, oxypurinol (OXY) was administered (50 mg/kg, i.p.) for 4d prior to virus infection and AHR challenge. Virus increased xanthine oxidase (XO) activity and OXY inhibited this effect, but AHR was not blocked. However, virus-infected OXY-pretreated animals had less protein in the bronchoalveolar lavage suggesting that OXY had reduced a portion of the virus-induced lung damage. Experiments are currently in progress to see if oxidative damage from leukocytes, rather than altered adenosine metabolism, contribute to AHR.

Keywords: *Air pollution effects(Animals), *Oxidizers, *Influenza, *Orthomyoviruses, *Airway resistance, Acetylcholine, Rats, Acetylcysteine, Virus diseases, Xanthine oxidase, Adenosine, Metabolism, Leukocytes, Bronchoalveolar lavage fluid, Lung, Oxypurinol, Reprints.

PB91-231233/REB PC **A03**/MF **A01**
In vitro Screening Batteries for Neurotoxicants.
Health Effects Research Lab., Research Triangle Park, NC.
B. Veronesi. 1991, 27p EPA/600/D-91/206

The need to develop, validate and utilize in vitro models to test chemicals for neurotoxic potential is widely appreciated. The lecture discusses the major advantages and disadvantages of using cell and tissue culture, the various in vitro models amenable for neurotoxicity studies, and the distinction between mechanistic and screening models. Major considerations for designing screening battery to evaluate neurotoxicants are discussed. Topics such as choice of appropriate cell models in the battery, choice and quantification of endpoints (i.e., cytotoxic and neurotoxic), and technical considerations in the design of the battery are discussed.

Keywords: *Toxic substances, *Toxicity, *Nervous system, In vitro analysis, Cell survival, Tissue culture, Nerve cells, Cell line, Cultured tumor cells, Tests.

PB91-231241/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
New Approach to Estimation of Relative Risks Due to Two or More Risk Factors under Multiple Matching in Case-Control Studies. Journal article.
Addis Ababa Univ. (Ethiopia). Dept. of Statistics.
A. Ejigou. c1990, 14p EPA/600/J-90/536
Grant EPA-R812483
Pub. in Biometric Jnl., v32 n5 p621-632 Apr 90. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

The analysis of case-control data using logistic regression involves making some critical model assumptions. In the analysis of matched data for which the values of the matching variables are unavailable, use of logistic regression presupposes that odds ratios are homogeneous over the levels of the matching variables; this is done since logistic regression cannot, at present, provide a way of testing for the homogeneity of odds ratios. In the model, it is possible, as in logistic regression, to estimate odds ratios, check the multiplicativity of effects, or test for the significance of association. In addition, and unlike logistic regression, the model enables one to test for the homogeneity of the odds ratios over the levels of the matching variables even, when explicit information is not available on the matching variables.

Keywords: *Case-control studies, *Epidemiology, *Biostatistics, Multivariate analysis, Regression analysis, Mathematical models, Risk, Odds ratio, Reprints.

PB91-231258/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Survival and Effects of Wild-Type, Mutant, and Recombinant 'Streptomyces' in a Soil Ecosystem. Journal article.
Idaho Univ., Moscow. Dept. of Bacteriology and Biochemistry.
Z. Wang, D. L. Crawford, A. L. Pometto, and F. Rafii. c1989, 11p EPA/600/J-89/541
Grant EPA-R-813486
Pub. in Canadian Jnl. of Microbiology, v35 p535-543 1989. Also pub. as Idaho Agricultural Experiment Station, Moscow. paper no. 8951. Prepared in cooperation with Iowa State Univ., Ames, and Idaho Agricultural Experiment Station, Moscow. Sponsored by Corvallis Environmental Research Lab., OR.

In a laboratory simulation, selected wild-type, mutant, and recombinant Streptomyces were released into a silt loam soil. Strains included genetically enhanced lignin decomposers and those expressing recombinant plasmids. Their survival and effects on soil organic carbon mineralization were monitored in sterile and non-sterile soil, with and without lignocellulose supplementation. Survival was followed by viable plate counts on selective media. This is the first report of released, genetically altered Streptomyces having a measurable effect on a natural ecosystem.

Keywords: *Terrestrial ecosystems, *Soil microbiology, *Streptomyces, Mutation, Genetic recombination, Survival analysis, Plasmids, Genetic engineering, Lignin, Microbial colony count, Minerals, Soil chemistry, Carbon dioxide, Bacterial spores, Reprints.

PB91-231266/REB PC **A03**/MF **A01**
Effect of Ozone Exposure on the Dispersion of Inhaled Aerosol Boluses in Healthy Human Subjects. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
M. J. Keefe, W. D. Bennett, P. Dewitt, E. Seal, and A. A. Strong. c6 Dec 90, 11p EPA/600/J-91/158
Pub. in American Review of Respiratory Disease, v144 n1 p23-30, Jul 91.

Acute exposure of humans to low levels of ozone are known to cause decreases FVC and increases sRaw. These alterations in lung function do not, however, elucidate the potential for acute small airways responses. In the study the authors employed a test of aerosol dispersion to examine the potential effects of ozone on small airways in humans. Twenty-two healthy nonsmoking male volunteers were exposed to 0.4 ppm ozone for one hour while exercising at 20 l/min/m2 (BSA). Prior to and immediately following exposure, tests of spirometry (FVC, FEV1, and FEF25-75) and plethysmography (Raw and sRaw) were performed. Subjects also performed an aerosol dispersion test before and after exposure. Each test involved a subject inhaling five to seven breaths of a 300 ml bolus of a 0.5 micrometers triphenyl phosphate (TPP) aerosol injected into a 2 l tidal volume. The bolus was injected into the tidal breath at three different depths: at depth A the bolus was injected after 1.6 l of clean air was inhaled from FRC; at depth B after 1.2 l; and at depth C after 1.2 l but with inhalation beginning from RV. The primary measure of bolus dispersion was the expired half-width (HW).

Keywords: *Air pollution effects(Humans), *Ozone, *Aerosols, *Respiratory function tests, Smoking, Spirometry, Plethysmography, Exposure, Test methods, Exercise(Physiology), Cardiovascular system, Reprints.

PB91-231274/REB PC **A03**/MF **A01**
Myelin Basic Protein-mRNA Used to Monitor Trimethyltin Neurotoxicity in Rats. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
B. Veronesi, J. Pringle, and C. Mezei. c1991, 11p EPA/600/J-91/159
Pub. in Toxicology and Applied Pharmacology, v108 n3 p428-435 May 91.Portions of this document are not fully legible. Prepared in cooperation with Dalhousie Univ., Halifax (Nova Scotia). Dept. of Biochemistry.

Trimethyltin (TMT) is an alkyltin that targets neurons of the limbic system. A gene probe (i.e., mRNA) for myelin basic protein (MBP), a major component of central nervous system myelin, was used to monitor this toxic neuropathy in Sprague-Dawley rats. Animals

were administered a single intraperitoneal injection of TMT-hydroxide at a neuropathic (8.0 mg/kg/body wt) or nonneuropathic (0.8 mg/kg/body wt) dose and sampled at 1, 3, or 7 days postexposure to correlate the progression of hippocampal neuropathology with probe (i.e., MBP-mRNA) levels. Microscopic examination of the brain showed only moderate but progressive damage over the 7-day postexposure period in animals treated with the neuropathic dose. Neuronal loss was first observed in the dendate gyrus and CA4 at 1 day postexposure, and progressed to the CA3c sector at 3 and 7 days postexposure. Elsewhere in the brain, minimal involvement of the entorhinal cortex neurons occurred 3 days postexposure and intensified by 7 days. No histological damage was seen at the nonneuropathic (0.8 mg/kg) dose. (Copyright (c) 1991 by Academic Press, Inc.)

Keywords: *Encephalitogenic basic proteins, *Messenger RNA, *Trimethyltin, *Toxicity, *Brain, Histology, RNA probes, Nerve cells, Nucleic acid hybridization, Northern blotting, Hippocampus, Pathology, Biochemistry, Reprints.

PB91-231282/REB PC **A03**/MF **A01**
Fimbria-Fornix Transections Disrupt the Ontogeny of Delayed Alternation but Not Position Discrimination in the Rat. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
J. H. Freeman, and M. E. Stanton. c1991, 12p EPA/600/J-91/160
Pub. in Behavioral Neuroscience, v105 n3 p386-395 Jun 91. Prepared in cooperation with North Carolina Univ. at Chapel Hill.

In Experiment 1, Long-Evans rat pups received fimbria-fornix transections or sham surgery on Postnatal Day 10 (PND10) and were then trained on PND23 to perform either a discrete-trials delayed alternation (DA) or a simple position discrimination (PD) task in a T maze. Rat pups in both surgical conditions learned the PD task within five 12-trial blocks of training. However, only sham-operated pups learned the DA task. In Experiment 2, performance of DA emerged between PND19 and PND27 in sham-operated pups but failed entirely to develop in pups with early lesions. In Experiment 3, fornix-transected pups that were given extended DA training (132 trials) on PND23-PND24 showed some improvement in performance but remained impaired in relation to sham-operated controls. These findings implicate the limbic system in the postnatal development of DA but not PD and suggest that dual-process theories of memory may be relevent to the psychobiology of cognitive development.

Keywords: *Surgery, *Ontogenesis, *Discrimination learning, Rats, Histology, Animal behavior, Acetylcholinesterase, Hippocampus, Immunohistochemistry, Reprints, *Fimbria-fornix transections.

PB91-231290/REB PC **A03**/MF **A01**
Northrop Services, Inc., Research Triangle Park, NC.
Immunotoxicity of 2-Methoxyethanol Following Oral Administration in Fischer 344 Rats. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
R. J. Smialowicz, M. M. Riddle, R. W. Luebke, C. B. Copeland, and D. Andrews. c1991, 16p EPA/600/J-91/161
Pub. in Toxicology and Applied Pharmacology, v109 p494-506 1991.Portions of this document are not fully legible. Sponsored by Northrop Services, Inc., Research Triangle Park, NC.

The immunotoxicity of the glycol ether 2-methoxyethanol (ME) was evaluated in adult Fischer 344 rats using a variety of in vitro and in vivo immune function assays. In the first phase of the study, male rats were dosed by oral gavage with ME in water, at dosages ranging from 50 to 200 mg/kg/day, for 10 consecutive days. In the second phase of the study, the PFC response to TNP-LPS was employed to assess the role that metabolism of ME to 2-methoxyacetic acid (MAA) plays in the immunotoxicity of this glycol ether. Ten-day oral dosing with MAA resulted in the inhibition of the PFC response to TNP-LPS at dosages of 50-200 mg/kg/day. Concomitant exposure of rats to ME and the alcohol dehydrogenase inhibitor 4-methylpyrazole blocked ME-induced suppression of this PFC response. Attempts to ameliorate ME-induced suppression of the PFC response with serine, which has been shown to reverse ME-induced developmental and reproductive toxicity, were unsuccessful. The results suggest that the immune system may be more sensitive than the reproductive system to the toxic effects of ME. Furthermore, it appears that MAA is the proximate toxicant for ME-induced alterations in the immune system as has been demonstrated for ME-induced reproductive and developmental toxicity.

Keywords: *Toxicity, *Immunity, Rats, Reproduction(Biology), Lymphocytes, Males, Females, Dose-response relationships, Body weight, Thymus gland, Fluorescent antibody techniques, Spleen, Testis, Interleukin-2, Reprints, *2-methoxyethanol.

PB91-231308/REB PC **A03**/MF **A01**
Relative Sensitivity of (32)P-postlabelling of DNA and the Autoradiographic UDS Assay in the Liver of Mice Exposed to 2-acetylaminofluorene (2AAF). Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
J. Ashby, P. A. Lefevre, T. Shank, J. Lewtas, and J. E. Gallagher. c1991, 12p EPA/600/J-91/162
Pub. in Mutation Research, v252 p259-268 1991. See also PB91-231316. Prepared in cooperation with Environmental Health Research and Testing, Inc., Research Triangle Park, NC., and Imperial Chemical Industries Ltd., Alderley Park (England). Central Toxicology Lab.

In contrast to earlier studies conducted at lower dose levels, 2AAF is shown to induce a positive UDS response in the liver of mice dosed orally at dose levels between 500 and 1000 mg/kg. Similarly exposed mice had low levels of 2AAF-related hepatic DNA adducts at dose levels in the range 10-1000 mg/kg 2AAF, as determined by (32)P-postlabelling analysis. It is concluded that the attenuated UDS response observed in the mouse liver, as compared to the rat liver, is due primarily to metabolic differences between these two species, coupled to a reduced capacity for UDS in the mouse liver for a given level of total 2AAF-related adducts per unit of DNA. (Copyright (c) 1991 Elsevier Science Publishers B.V.)

Keywords: *2-Acetylaminofluorene, *Deoxyribonucleic acids, *DNA repair, *Liver, *Toxicity, Autoradiography, Phosphorus 32, Dose-response relationships, Mice, Carcinogens, Metabolism, In vivo analysis, DNA damage, Reprints.

PB91-231316/REB PC **A03**/MF **A01**
Relative Sensitivity of (32)P-postlabelling of DNA and the Autoradiographic UDS Assay in the Liver of Rats Exposed to 2-acetylaminofluorene (2AAF). Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
J. E. Gallagher, T. Shank, J. Lewtas, P. A. Lefevre, and J. Ashby. c1991, 13p EPA/600/J-91/163
Pub. in Mutation Research, v252 p247-257 1991. See also PB91-231308. Prepared in cooperation with Environmental Health Research and Testing, Inc., Research Triangle Park, NC., and Imperial Chemical Industries Ltd., Alderley Park (England). Central Toxicology Lab.

Groups of Alderly Park male rats were dosed concomitantly with 2-AAF by gavage at doses between 0.01 mg/kg and 40 mg/kg, and livers sampled 2-72h later. The liver of one group of animals was perfused to yield hepatocytes which were assayed in vitro for unscheduled DNA synthesis (UDS) via incorporation of tritiated thymidine and autoradiography. DNA was extracted from the livers of the other group and DNA adduct levels determined using the (32)P-postlabelling technique. The major C-8 2-aminofluorene/guanosine and three minor adducts were quantitated enabling the relative sensitivity of the two techniques to be compared. A dose and time related UDS response was observed, which at the most sensitive time point enabled DNA repair to be discerned at a dose level of 0.1 mg/kg of 2AAF, a response classified formally at 5 mg/kg 2AAF. Only the C-8 adduct as determined by (32)p-postlabeling analysis was discernible at doses as low as 0.01 mg/kg of 2AAF. It is concluded that as part of a well-defined dose response, UDS can be discerned with confidence for doses of 2AAF between 0.1-5 mg/kg and DNA adducts for doses of 2AAF between 0.01-1.0 mg/kg. (Copyright (c) 1991 Elsevier Science Publishers B.V.)

Keywords: *2-Acetylaminofluorene, *Deoxyribonucleic acids, *DNA repair, *Toxicity, *Liver, Autoradiography, Phosphorus 32, Carcinogens, Dose-response relationships, Tables(Data), Rats, Reprints.

PB91-231324/REB PC **A02**/MF **A01**
Compatibility of Organic Solvents with the Microscreen Prophage-Induction Assay: Solvent - Mutagen Interactions.
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
D. M. DeMarini, B. K. Lawrence, H. G. Brooks, and V. S. Houk. c1991, 9p EPA/600/J-91/164
Pub. in Mutation Research, v263 p107-113 1991. Prepared in cooperation with Environmental Health Research and Testing, Inc., Durham, NC.

The following solvents did not induce prophage lambda in the Escherichia coli WP2 lambda Microscreen assay: acetone, benzene, chloroform, ethanol, n-hexane, isopropanol, methanol, toluene, and a mixture of the three isomers of xylene. Dimethyl sulfoxide was genotoxic in the presence and absence of S9, and methylene chloride was weakly genotoxic in the presence of S9. The genotoxic potencies of 2-aminoanthracene and 2-nitrofluorene were reduced when dissolved in DMSO or methanol compared to their potencies when dissolved in acetone. (Copyright (c) 1991 Elsevier Science Publishers B.V.)

Keywords: *Mutagens, *Organic solvents, *Toxicity, *Phage lambda, Mutagenicity tests, Escherichia coli, Metabolic activation, Hexanes, Acetone, Benzene, Chloroform, Ethyl alcohol, Propyl alcohol, Carbinols, Toluene, Xylenes, Chloromethanes, Dimethyl sulfoxide, Reprints, Aminoanthracenes, Nitrofluorenes.

PB91-231332/REB PC **A02**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Respiratory Symptoms and Risk Factors in an Arizona Population Sample of Anglo and Mexican-American Whites.
Arizona Univ., Tucson. Coll. of Medicine.
C. Di Pede, G. Viegi, J. J. Quackenboss, P. Boyer-Pfersdorf, and M. D. Lebowitz. cJun 91, 10p EPA/600/J-91/165
Pub. in CHEST, v99 p916-922 Apr 91. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

Prevalence rates of respiratory symptoms and diseases in a large group of Anglos and Mexican-Americans were analyzed. Each subject completed a questionnaire. Among current smokers, chronic productive cough and dyspnea were significantly higher in both ethnic groups; wheezy symptoms were higher in Anglos. There were no significant differences in the symptom prevalence rates between the two groups, after stratifying by current cigarette consumption and CRT. The spirometric values were not significantly different. In both ethnic groups, the prevalence rates of wheeze, SOBWHZ and asthma were significantly higher in those who had CRT. Among Anglos, less educated smokers had significantly higher prevalence rates of SOBWHZ and dyspnea; nonsmokers with less education had higher prevalence rates of cough, chronic cough and dyspnea. Results confirm the importance of CRT and lower educational level as risk factors for respiratory symptoms. Ethnicity is not associated with symptomatology or lung function impairment.

Keywords: *Hispanic Americans, *Risk factors, *Respiratory diseases, *Whites, Signs and symptoms, Questionnaires, Smoking, Prevalence, Respiratory function tests, Educational status, Cough, Dyspnea, Ethnic groups, Bronchitis, Chronic disease, Asthma, Arizona, Reprints.

PB91-231340/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC.
Exposure Assessment Approaches to Evaluate Respiratory Health Effects of Particulate Matter and Nitrogen Dioxide. Journal article.
Arizona Univ., Tucson. Div. of Respiratory Sciences.
J. J. Quackenboss, M. Krzyzanowski, and M. D. Lebowitz. c1991, 27p EPA/600/J-91/166
Pub. in Jnl. of Exposure Analysis and Environmental Epidemiology, v1 n1 p83-107, 1 Jan 91. Prepared in cooperation with Panstwowy Zaklad Higieny, Warsaw

(Poland). Dept. of Medical Statistics. Sponsored by Environmental Protection Agency, Research Triangle Park, NC.

Several approaches can be taken to estimate or classify total personal exposures to air pollutants. While personal exposure monitoring (PEM) provides the most direct measurements, it is usually not practical for extended time periods or large populations. The paper describes the use of indirect approaches to estimate total personal exposure for NO2 and particulate matter (PM), summarizes the distributions of these estimates, and compares the effectiveness of these estimates with microenvironmental concentrations for evaluating effects on respiratory function and symptoms. Pollutant concentrations were measured at several indoor and outdoor locations for over 400 households participating in an epidemiological study in Tucson, Arizona. Central site monitoring data were significantly correlated with samples collected directly outside homes, but the former usually had higher pollutant concentrations. Integrated indices of daily total personal exposure were calculated using micro-environmental (ME) measurements or estimates and time-budget diary information. (Copyright (c) 1991 Princeton Scientific Publishing Co., Inc.)

Keywords: *Air pollution effects(Humans),*Particles, *Nitrogen dioxide, *Public health, Air pollution, Respiratory function tests, Populations, Monitoring, Exposure, Regression analysis, Indoor air pollution, Health status indicators, Tobacco, Smoking, Seasonal variations, Asthma, Children, Reprints.

PB91-231357/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC.
Normal Range of Diurnal Changes in Peak Expiratory Flow Rates: Relationship to Symptoms and Respiratory Disease. Journal article.
Arizona Univ., Tucson. Div. of Respiratory Sciences.
J. J. Quackenboss, M. D. Lebowitz, and M. Krzyzanowski. cJun 91, 10p EPA/600/J-91/167
Grant EPA-R-815650
Pub. in American Review of Respiratory Disease, v143 p323-330 Feb 91. Sponsored by Environmental Protection Agency, Research Triangle Park, NC.

Measuring peak expiratory flow rates (PEFR) several times a day can provide an objective assessment of functional changes relative to environmental or occupational exposures. The report describes the pattern of diurnal changes in PEFR in a reference population, and defines ranges of normal between-and within-day variability. An index of diurnal changes were defined as the ratio between maximal and minimal values, where the maximal value was restricted to PEFR measured at noon or in the evening (N,E) and the minimal value was restricted to the morning or at bedtime (M,B). A ratio greater than normal represented an exaggeration of the normal diurnal pattern in PEFR. Normal limits, based on the ninety-fifth percentile in the reference population, were larger for children (130%) than for adults 15 to 35 yr of age (117%) and those older than 35 yr of age (118%). The meaningfulness of excessive diurnal changes in PEFR was examined by relating this ratio (Max/Min), and a similar measure (the amplitude percent mean) to chronic respiratory symptoms and diseases in 939 adults and children who recorded PEFR values 2 to 4 times per day for as long as 14 days.

Keywords: *Diurnal variations, *Respiratory diseases, *Peak expiratory flow rate, Signs and symptoms, Asthma, Air pollution effects(Humans), Occupational exposure, Airway resistance, Test methods, Aging(Biology), Spirometry, Reprints.

PB91-231365/REB PC **A02/MF A01**
Corvallis Environmental Research Lab., OR.
Co-Occurrence of Ozone and Acidic Cloudwater in High-Elevation Forests. Journal article.
Oregon State Univ., Corvallis. Dept. of Atmospheric Sciences.
R. J. Vong, and P. Guttorp. c1991, 7p EPA/600/J-91/168
Pub. in Environmental Science and Technology, v25 n7 p1325-1329 1991. Prepared in cooperation with Washington Univ., Seattle. Dept. of Statistics. Sponsored by Corvallis Environmental Research Lab., OR.

A chemical climatology for high-elevation forests was estimated from ozone and cloudwater acidity data collected in the eastern United States. Besides frequent ozone-only and pH-only single-pollutant episodes, both simultaneous and sequential co-occurrence of ozone and acidic cloudwater were observed a few times each month above cloud base. Co-occurrence was observed more frequently at two southern sites than at two northern sites. This co-occurrence represents a multiple chemical stress whose biological implications can now for the first time be studied in controlled exposures of trees. (Copyright (c) 1991 American Chemical Society.)

Keywords: *Forests, *Acidification, *Air pollution effects(Plants), *Ozone, *Precipitation(Meteorology), Exposures, Clouds(Meteorology), pH, Acid rain, High altitude environments, Biological effects, Reprints, Eastern Region(United States).

PB91-231373/REB PC **A02/MF A01**
Correlation of Coliform Growth Response with Other Water Quality Parameters. Journal article.
Environmental Protection Agency, Cincinnati, OH. Microbiological Treatment Branch.
E. W. Rice, P. V. Scarpino, D. J. Reasoner, G. S. Logsdon, and D. K. Wild. c1991, 7p EPA/600/J-91/169
Pub. in Jnl. American Water Works Association, p98-102 Jul 91. Prepared in cooperation with Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering, Black and Veatch, Cincinnati, OH., and National Inst. for Occupational Safety and Health, Cincinnati, OH.

A variety of water types collected from different stages of water treatment from different geographical areas were analyzed by bioassay for their ability to support the growth of coliform bacteria. The results of the analyses were compared with other water quality parameters. The nutrient status of the water, based upon the coliform bioassay, did not correlate with any of the measured water quality parameters except assimilable organic carbon (AOC). In general, the coliform growth response increased with increasing levels of AOC. Differences were seen between the coliform growth response and various treatment types, with significantly higher responses being associated with waters which had been exposed to ozonation. The coliform bioassay procedure provides a viable method for ascertaining the biological stability of drinking water supplies.

Keywords: *Water microbiology, *Potable water, *Coliform bacteria, *Water quality, Water treatment, Growth, Microbial colony count, Ozone, Bioassay, Carbon, Nutrients, pH, Temperature, Chemical analysis, Reprints.

PB91-231381/REB PC **A02/MF A01**
Potential Effects of Polyphosphate Products on Lead Solubility in Plumbing Systems. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
T. R. Holm, and M. R. Schock. 1991, 10p EPA/600/J-91/170
Pub. in Jnl. of American Water Works Association, v83 n7 p76-82 1991. Prepared in cooperation with Illinois State Water Survey Div., Champaign.

Lead concentrations in drinking water can be minimized by adjusting the pH and alkalinity. Such lead solubility controls, however, may be offset by other water treatment measures that inadvertently increase lead solubility, e.g., the adding of polyphosphate-containing products. Through the use of solubility computations, the authors conclude that, at best, the application of polyphosphates for the specific purpose of lead corrosion control entails considerable uncertainty and risk.

Keywords: *Potable water, *Lead(Metal), *Plumbing, *Phosphates, *Solubility, pH, Water treatment, Water quality, Corrosion, Reprints.

PB91-231399/REB PC **A01/MF A01**
Determination of 'Giardia lamblia' Cyst Infective Dose for the Mongolian Gerbil ('Meriones unguiculatus'). Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
F. W. Schaefer, C. H. Johnson, C. H. Hsu, and E. W. Rice. c1991, 4p EPA/600/J-91/171
Pub. in Applied and Environmental Microbiology, v57 n8 p2408-2409 Aug 91. Prepared in cooperation with Computer Sciences Corp., Cincinnati, OH.

The purpose of the study was to determine the I.D.(50) for Giardia lamblia (CDC:0284:1) cysts in Mongolian gerbils (Meriones unguiculatus) and compare it to human infectivity data. Cysts were purified from Mongolian gerbil feces and diluted to produce inocula for each dosage group. After observation of the gerbils for production of either cysts in the feces or trophozoites in the small intestine over a two week period, the I.D.(50) results calucated by Probit anaysis, Spearman-Karber, and Reed-Muench were 282, 288, and 219 cysts, respectively. A least squares regression analysis, relating the number of cysts inoculated and the percent of infectivity, estimated the log(10) I.D.(50) to be 2.50, with a coefficient of correlation (r) of 0.9689. The log(10) I.D.(50) derived by this method is similar to those calculated by the previous methods. Since human feeding studies indicate the I.D.(50) for humans is < or = 10 and the authors results indicate the I.D.(50) for gerbils to be around 285 cysts, the gerbil model can not be trusted to reflect what might happen in human exposures.

Keywords: *Water quality, *Giardia lamblia, *Potable water, Virulence, Gerbils, Dose-response relationships, Regression analysis, Animal disease models, Reprints, Meriones unguiculatus.

PB91-231407/REB PC **A03/MF A01**
H4IIE Hepatoma Cell Bioassay-Derived 2,3,7,8-Tetrachlorodibenzo-p-Dioxin Equivalents in Colonial Fish-Eating Waterbird Eggs from the Great Lakes. Journal article.
Environmental Research Lab.-Duluth, MN.
D. E. Tillitt, G. T. Ankley, D. A. Verbrugge, J. P. Giesy, and J. P. Ludwig. c1991, 13p EPA/600/J-91/172
Pub. in Archives of Environmental Contamination and Toxicology, v21 p91-101 Jun 91. Prepared in cooperation with Fish and Wildlife Service, East Lansing, MI. Div. of Ecological Services.

Fish-eating waterbirds from the Great Lakes of North America have shown symptoms of poisoning similar to those observed in laboratory exposures of various avian species to planar halogenated hydrocarbons(PHHs). PHHs, include among others, polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs) and have been implicated in some of the reproductive problems of Great Lakes waterbirds.

Keywords: *Water pollution effects(Animals), *Tetrachlorodibenzodioxin, *Birds, *Wildlife, *Toxicity, *Eggs, Polychlorobiphenyl compounds, Aromatic polycyclic hydrocarbons, Reproduction(Biology), Great Lakes, Bioassay, Hepatoma, Rats, Dose-response relationships, Diet, Fish, Reprints, Polychlorinated dibenzo-p-dioxins, Polychlorinated dibenzofurans.

PB91-231415/REB PC **A02/MF A01**
Piperonyl Butoxide as a Tool in Aquatic Toxicological Research with Organophosphate Insecticides. Journal article.
Environmental Research Lab., Duluth, MN.
G. T. Ankley, J. R. Dierkes, D. A. Jensen, and G. S. Peterson. c1991, 9p EPA/600/J-91/173
Pub. in Ecotoxicology and Environmental Safety, v21 p266-274 Jun 91. Prepared in cooperation with AScI Corp., Duluth, MN.

Experiments were conducted to determine the effects of piperonyl butoxide, a synthetic methylenedioxphenyl inhibitor of cytochrome(s) P450, on the toxicity of organophosphate insecticides to three cladoceran test species: Ceriodaphnia dubia, Daphnia magna, and Daphnia pulex. Coadministration of piperonyl butoxide effectively reduced the acute toxicity of four metabolically activated organophosphates (parathion, methyl parathion, diazinon, and malathion) and did not affect the toxicity of three organophosphates not requiring metabolic activation (dichlorvos, chlorfenvinphos, and mevinphos). These results indicate that piperonyl butoxide may be an effective tool in toxicological research focused upon identifying specific compounds responsible for toxicity in complex aqueous mixtures. (Copyright (c) 1991 Academic Press, Inc.)

Keywords: *Toxicology, *Organophosphate insecticides, *Piperonyl butoxide, *Water pollution effects(Animals), Daphnia, Cytochrome p-450, Metabolic activation, Diazinon, Malathion, Methyl parathion, Parathion, Reprints, Ceriodaphnia dubia.

PB91-231423/REB PC **A02**/MF **A01**
Environmental Research Lab., Athens, GA.
DBAPE-A Database and Model Parameter Analysis System for Agricultural Soils to Support Water Quality Management. Journal article.
AQUA TERRA Consultants, Decatur, GA.
J. C. Imhoff, R. F. Carsel, J. L. Kittle, and P. R. Hummel. c1991, 9p EPA/600/J-91/174
Contract EPA-68-03-3513
Pub. in Water Science and Technology, v24 n6 p331-337 Jun 91. See also PB90-193053. Sponsored by Environmental Research Lab., Athens, GA.

The Data Base Analyzer and Parameter Estimator (DBAPE) is a practical tool for (1) analyzing a national database containing geographic and soils properties data and locations for meteorologic stations, and (2) estimating parameters for subsurface flow models. DBAPE merges four technologies (database management, a user interface, process algorithms, and graphics) in a hardware-portable environment to provide a broad range of capabilities for search and analysis of agricultural soils to support water quality management. (Copyright (c) 1991 IAWPRC.)

Keywords: *Computerized simulation, *Water quality management, *Agricultural engineering, *Soil properties, *Water pollution, Data base management, Portable equipment, Subsurface flow, Computer graphics, Geographical regions, Pesticides, Reprints, *DBAPE computer program, *Data Base Analyzer and Parameter Estimator.

PB91-231431/REB PC **A02**/MF **A01**
Effects of Solar Radiation on Manganese Oxide Reactions with Selected Organic Compounds. Journal article.
Environmental Research Lab., Athens, GA.
D. J. Bertino, and R. G. Zepp. c1991, 9p EPA/600/J-91/175
Pub. in Environmental Science and Technology, v25 n7 p1267-1273 Jul 91.

The effects of sunlight on aqueous redox reactions between manganese oxides (MnOx) and selected organic substances are reported. No sunlight-induced rate enhancement was observed for the MnOx oxidation of substituted phenols, anisole, o-dichlorobenzene, or p-chloroaniline. On the other hand, solar radiation did accelerate the reduction of manganese oxides by dissolved organic matter (DOM) from aquatic environments. The photoreduction of MnOx by DOM was little affected by molecular oxygen in air saturated water (250 microM), but was inhibited by 2,6-dichloroindophenol (0.5-6 microM), an excellent electron acceptor. MnOx reduction also was photosensitized by anthraquinone-2-sulfonate. These results indicate that the photoreduction probably involves electron transfer from excited states of sorbed DOM to the oxide surface. Wavelength studies indicated that ultraviolet-B radiation (280-320 nm) plays an important role in the photoreduction. (Copyright (c) 1991 by the American Chemical Society.)

Keywords: *Photochemical reactions, *Manganese oxides, *Solar radiation, *Ultraviolet radiation, *Phenols, Organic compounds, Water pollution, Degradation, Reduction(Chemistry), Catalysis, Electron transfer, Reprints, Dissolved organic matter.

PB91-231449/REB PC **A02**/MF **A01**
Photolysis of Copper(II)-Amino Acid Complexes in Water. Journal article.
Environmental Research Lab., Athens, GA.
K. Hayase, and R. G. Zepp. c1991, 8p EPA/600/J-91/176
Pub. in Environmental Science and Technology, v25 n7 p1273-1279 Jul 91.

Kinetics of the photolysis of Cu(+2)-amino acid complexes were investigated under sunlight or monochromatic radiation. Under sunlight (latitude 40 deg N) in the absence of dioxygen, the mean half-lives estimated for the photoreduction of the bis-Cu(+2) complexes (CuL2) at pH 8.0 and 25C were 0.55, 1.6, 8.6, 8.8, 45 and 71 days for L = tris(hydroxymethyl)aminomethane (Tris), beta-alanine, L-aspartic acid, L-glutamic acid, glycine, and histidine, respectively. Under monochromatic UV irradiation (310 nm) with dioxygen absent, quantum yields for the photoproduction of Cu(I) from CuL2 were found to be 0.071, 0.098, 0.063, 0.066, 0.025, and 0.0011 for L = Tris, beta-alanine, L-aspartic acid, L-glutamic acid, glycine, and L-histidine, respectively. The effects of pH on the quantum yields were determined for Cu(+2)-beta-alanine and Cu(+2)-Tris complexes. Decreases in quantum yields observed with increasing acidity were attributed to changes in speciation from predominantly CuL2 to less photoreactive complexes, mainly CuL and Cu(+2). In air-saturated solutions, rates and quantum yields for Cu(I) formation were reduced sharply and hydrogen peroxide was formed. Results of the study suggest that photoreactions of Cu(+2) coordination complexes may contribute to its toxicity to aquatic biota.

Keywords: *Copper complexes, *Photolysis, *Amino acids, *Water pollution, Ligands, Toxicity, Ultraviolet radiation, Solar radiation, Reduction(Chemistry), Photochemical reactions, Reaction kinetics, pH, Reprints.

PB91-231456/REB PC **A05**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Technology Evaluation Report: Design and Development of a Pilot-Scale Debris Decontamination System. Volume 1.
IT Environmental Programs, Inc., Cincinnati, OH.
M. L. Taylor, and M. Dosani. Aug 91, 97p EPA/540/5-91/006A
Contract EPA-68-03-3413
See also PB91-231464. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Metallic, masonry, and other solid debris that may be contaminated with hazardous chemicals litter numerous hazardous waste sites in the United States. Polychlorinated biphenyls (PCB's), pesticides, lead or other metals are some of the contaminants of concern. In some cases cleanup standards have been established (e.g., 10 micrograms PCB's/100 sq cm for surfaces to which humans may be frequently exposed). Decontaminated debris could be either returned to the site as 'clean' fill, or, in the case of the metallic debris, sold to a metal smelter. The project involves the development and demonstration of a technology specifically for performing on-site decontamination of debris. Both bench-scale and pilot-scale versions of a debris washing system (DWS) have been designed, constructed and demonstrated. The DWS entails the application of an aqueous solution during a high-pressure spray cycle, followed by turbulent wash and rinse cycles. The aqueous cleaning solution is recovered and reconditioned for reuse concurrently with the debris-cleaning process, which minimizes the quantity of process water required to clean the debris.

Keywords: *Hazardous materials, *Waste treatment, *Decontamination, *Debris, Technology utilization, Cleaning, Waste utilization, On-site investigations, Washing, Spraying, Materials recovery, Polychlorinated biphenyls, Pesticides, Lead(Metal), Metals, Pilot studies, Surfactants, *Cleanup operations.

PB91-231464/REB PC **A12**/MF **A03**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Technology Evaluation Report: Design and Development of a Pilot-Scale Debris Decontamination System. Volume 2.
IT Environmental Programs, Inc., Cincinnati, OH.
M. L. Taylor, and M. Dosani. Aug 91, 264p EPA/540/5-91/006B
Contract EPA-68-03-3413
See also PB91-231456. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Metallic, masonry, and other solid debris that may be contaminated with hazardous chemicals litter numerous hazardous waste sites in the United States. Polychlorinated biphenyls (PCB's), pesticides, lead or other metals are some of the contaminants of concern. In some cases cleanup standards have been established (e.g., 10 microgram PCB's/100 sq cm for surfaces to which humans may be frequently exposed). Decontaminated debris could be either returned to the site as 'clean' fill, or, in the case of the metallic debris, sold to a metal smelter. The project involves the development and demonstration of a technology specifically for performing on-site decontamination of debris. Both bench-scale and pilot-scale versions of a debris washing system (DWS) have been designed, constructed and demonstrated. The DWS entails the application of an aqueous solution during a high-pressure spray cycle, followed by turbulent wash and rinse cycles. The aqueous cleaning solution is recovered and reconditioned for reuse concurrently with the debris-cleaning process, which minimizes the quantity of process water required to clean the debris. This volume, of the two volume series contains the data in table format.

Keywords: *Hazardous materials, *Waste treatment, *Decontamination, *Debris, Technology utilization, On-site investigations, Washing, Spraying, Materials recovery, Polychlorinated biphenyls, Pesticides, Lead(Metal), Metals, Pilot studies, Surfactants, *Cleanup operations.

PB91-231472/REB PC **A06**/MF **A02**
ManTech Environmental Technology, Inc., Corvallis, OR.
Overview of Methods for Evaluating Effects of Pesticides on Reproduction in Birds.
Corvallis Environmental Research Lab., OR.
R. S. Bennett, and L. M. Ganio. Aug 91, 113p EPA/600/3-91/048
Sponsored by ManTech Environmental Technology, Inc., Corvallis, OR.

The standard test methods used by the U. S. Environmental Protection Agency for evaluating the effects of pesticides on avian reproduction are critiqued. The intent of the report is to review several concerns that have been raised about the adequacy of the test methods, discuss ways to improve the regulatory utility of the test, and present alternative methods that discuss aspects of avian reproduction that are not addressed by current test methods. The overview of current test methods includes the selection of measurement variables, experimental design, selection of test animals, testing environmental and husbandry methods, egg collection and incubation, observations of progeny, and data analysis and interpretation. Alternative test methods are discussed that determine a dose-response relationship of pesticide effects, employ a shorter exposure period for less persistent pesticides, or utilize parental incubation to determine pesticide-induced behavioral anomalies. Alternative measurement endpoints and data analysis methods also are present.

Keywords: *Reproduction(Biology), *Birds, *Pesticides, Tests, Dose-response relationships, Organ weight, Ecology, Risk assessment, Calcium, Blood chemical analysis, Diet, Food consumption, Eggs, Exposure.

PB91-231480/REB PC **A17**/MF **A04**
Methods for the Determination of Organic Compounds in Drinking Water. Revised July 1991.
Environmental Monitoring Systems Lab., Cincinnati, OH. Chemistry Research Div.
Dec 88, 397p EPA/600/4-88/039

Thirteen analytical methods for the identification and measurement of organic compounds in drinking water are described in detail. Six of the methods are for volatile organic compounds (VOC's) and certain disinfection by products, and these methods were cited in the Federal Register of July 8, 1987, under the National Primary Drinking Water Regulations. The other seven methods are designed for the determination of a variety of synthetic organic compounds and pesticides, and these methods were cited in proposed drinking water regulations in the Federal Register of May 22, 1989. Five of the methods utilize the inert gas purge-and-trap extraction procedure for VOC's, six methods employ a classical liquid-liquid extraction, one method uses a new liquid-solid extraction technique, and one method is for direct aqueous analysis. Of the 13 methods, 12 use either packed or capillary gas chromatography column separations followed by detection with mass spectrometry or a selective gas chromatography detector. One method is based on a high performance liquid chromatography separation.

Keywords: *Water analysis, *Potable water, *Organic compounds, *Water pollution detection, Volatile organic compounds, Pesticides, Extraction, Gas chromatography, Performance evaluation, Mass spectroscopy, Disinfection, Water treatment, High performance liquid chromatography.

PB91-231498/REB PC **A14**/MF **A03**
Methods for the Determination of Metals in Environmental Samples.
Environmental Monitoring Systems Lab., Cincinnati, OH. Chemistry Research Div.
Jun 91, 305p EPA/600/4-91/010

Thirteen analytical methods covering 36 analytes which may be present in a variety of environmental sample types are described in detail. Three of these methods are sample preparation procedures that require a separate determinate step found in other methods in the manual or elsewhere. These methods involve a wide range of analytical instrumentation including inductively coupled plasma (ICP) atomic emission spectroscopy (AES), ICP mass spectroscopy (MS), atomic absorption (AA) spectroscopy, ion chromatography (IC), high performance liquid chromatography (HPLC), and gas chromatography (GC). Application of these techniques to a diverse group of sample types is a somewhat unique feature of the manual. Sample types include waters ranging from drinking water to marine waters as well as industrial and municipal waste water. Methods are also included that will accommodate biological tissues and sediments and soils. Providing a set of comprehensive methods that are applicable to the widest variety of environmental samples and EPA regulatory programs is likely to become more pronounced in the future.

Keywords: *Metals, *Environmental surveys, *Chemical analysis, *Manuals, Sample preparation, Mass spectroscopy, Gas chromatography, Atomic spectroscopy, Bioassay, Soil analysis, Sediments, Emission spectroscopy, Absorption spectra, Ion spectroscopy, Water pollution detection, Land pollution, High performance liquid chromatography.

PB91-231506/REB PC **A04/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Temperature Scenario Development Using Regression Methods. Phase 2. Final rept.
North Carolina Univ. at Chapel Hill. Dept. of Geography.
P. J. Robinson. Aug 91, 58p EPA/600/3-91/049
See also PB91-192022. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

A method of developing scenarios of future temperature conditions resulting from climatic change is presented. The method is straightforward and can be used to provide information about daily temperature variations and diurnal ranges, monthly average high and low temperatures, and the frequency with which user-selected high- and low-temperature thresholds are crossed. Linear regressions between monthly average temperature and these various attributes are established by using the observational record of daily maximum and minimum temperature. These regressions are then used to estimate values from the monthly average temperatures estimated by General Circulation Models to occur as a result of a doubling of atmospheric CO(2). Values can be established for any location having daily temperature records. For the United States the station density is sufficient to allow the creation of detailed regional scenarios on the spatial and temporal scales required for impact assessment. The assumptions, scientific and statistical, inherent in this regression-based approach are reviewed. The method has been incorporated into a self-contained PC-based computer program requiring only the actual temperature data to be input by the user. A demonstration of the use of the program, incorporating discussion of techniques for evaluating the quality of the resultant scenario, is provided.

Keywords: *Climatic changes, *Greenhouse effect, *Computerized simulation, *Regression analysis, *Temperature distribution, Climatology, Carbon dioxide, Atmospheric circulation, Computer programs.

PB91-231514/REB PC **A10/MF A03**
Robert S. Kerr Environmental Research Lab., Ada, OK. Processes and Systems Research Div.
Modeling Multiphase Organic Chemical Transport in Soils and Ground Water.
Virginia Polytechnic Inst. and State Univ., Blacksburg.
J. C. Parker, A. K. Katyal, J. J. Kaluarachchi, R. J. Lenhard, and T. J. Johnson. Aug 91, 217p EPA/600/J-91/042
Grant EPA R-814320
Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK. Processes and Systems Research Div.

Subsurface contamination due to immiscible organic liquids is a widespread problem which poses a serious threat to ground-water resources. In order to understand the movement of such materials in the subsurface, a mathematical model was developed for multiphase flow and multicomponent transport in porous media with water, NAPL and air or any subset of these phases. Numerical procedures for solving the system of coupled flow equations, based on various formulations of the governing equations, were compared. Accurate representation of three-phase permeability-saturation-capillary pressure (k-S-P) relations is crucial to model multiphase fluid movement and accurate models for interphase mass partitioning are critical to describe species transport. A detailed description of hysteresis in three-phase k-S-P relations was reported. Simplified models, which consider effects of nonwetting fluid entrapment, were shown to provide a reasonable compromise between accuracy, on the one hand, and efficiency and robustness, on the other. Laboratory studies of light and dense NAPLs in a 1 x 1.5 meter sand tank, involving measurements of water and NAPL pressures and saturations and component concentrations, are described. These studies were used to validate the mathematical model for multiphase flow and transport.

Keywords: *Subsurface investigations, *Environmental transport, *Organic compounds, *Water pollution, *Land pollution, *Mathematical models, Groundwater movement, Soil surveys, Porous media, Groundwater resources, Base flow, Multiphase flow, Mass transfer, Permeability, Saturation, Pore pressure, *Nonaqueous phase liquid.

PB91-231522/REB PC **A05/MF A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Compatibility of Flexible Membrane Liners and Municipal Solid Waste Leachates.
Matrecon, Inc., Alameda, CA.
H. E. Haxo. Aug 91, 99p EPA/600/2-91/040
Contract EPA-68-03-3413
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

In a study designed to determine the current composition of municipal solid waste (MSW) leachate and its chemical resistance with flexible membrane liners (FMLs), the literature was surveyed and limited experiments on absorption of organics by FMLs were done. The object of the survey and study was to assess how well EPA Method 9090 can evaluate the resistance of FMLs with MSW leachate. It should be noted that EPA Method 9090 was originally developed for evaluating the chemical resistance of FMLs with hazardous waste leachate. At present, it is questionable whether Method 9090 yields realistic results for judging this resistance. The Method may yield misleading results because of the instability of the MSW leachate and the low concentrations of leachate organics presently reported.

Keywords: *Municipal wastes, *Land pollution control, *Solid waste disposal, *Linings, *Chemical resistance, Leaching, Performance evaluation, Membranes, Organic compounds, Information transfer, Materials tests, Chemical properties, Adsorption, Tables(Data), Graphs(Charts), Compatibility methods, Chemical composition, Physical properties, *Flexible membrane liners, *EPA method 9090.

PB91-231530/REB PC **A09/MF A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Opportunity Assessment: A Photofinishing Facility. Final rept.
Science Applications International Corp., McLean, VA.
Aug 91, 184p EPA/600/2-91/039
Contract EPA-68-C8-0061
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A waste minimization opportunity assessment was performed which identified areas for waste reduction at a photofinishing facility. The study followed procedures in the EPA Waste Minimization Opportunity Assessment Manual. The report identifies potential options to achieve further waste minimization progress. A number of waste producing processes were initially screened, and detailed technical evaluations were performed on wastes associated with process solutions and wash waters. Options identified were as follows: (1) wash water control; (2) silver recovery--metal replacement cartridges; (3) silver recovery--electrowinning (4) electrowinning with MRC tailing; (5) recovery of silver--ion exchange; (6) recovery of fixer; (7) recovery of bleach fix; and (8) recovery of developer. Based on the results of the assessment phase, Options 1-4 and 7 were selected for further evaluation in the feasibility phase. The results of the study indicate the fastest payback would be realized from Options 1 and 7 assuming Accuphoto's willingness to recycle bleach and no production increases.

Keywords: *Waste management, *Photographic processing chemicals, Water pollution control, Materials recovery, Electrowinning, Ion exchanging, Feasibility studies, Waste recycling, *Waste minimization, Source reduction.

PB91-231548/REB PC **A17/MF A04**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
RACT/BACT/LAER Clearinghouse: A Compilation of Control Technology Determinations. First Supplement to 1990 Edition. Final rept.
VIGYAN, Inc., Falls Church, VA.
D. Di Mauro, and C. Duffy. Jul 91, 385p EPA/450/3-91/015
Contract EPA-68-D0-0177
See also PB90-259714. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The Clean Air Act as amended in 1977 prescribes several technology-based limitations affecting new or modified air pollution sources: (1) new source performance stds. (NSPS); (2) best available control technology (BACT); (3) lowest achievable emission rate (LAER). The basic purposes of the RACT/BACT/LAER Clearinghouse are to: (1) provide State and local air pollution control agencies with current information on case-by-case control technology determinations that are made nationwide and (2) promote communication, cooperation, and sharing of control technology information among the permitting agencies. The information presented in this compilation was abstracted from preconstruction permits and submitted voluntarily by the State and local air pollution control agencies. The Clearinghouse is intended as a reference for State and local agencies in making RACT/BACT/LAER decisions. Since the 1985 BLC document was published in June of that year, annual supplements containing only those determinations inserted or revised during the previous 12 months were published. A master edition containing all new/revised determinations completed during the past 5 years was published in June 1990. This is the first supplement to that edition.

Keywords: *Air pollution control, *New Source Performance Standards, *Best technology, *Lowest achievable emission rates, *Air pollution abatement, *Information sources, US EPA, Air pollution standards, Technology utilization, Information transfer, State government, Permits, Pollution sources, Tables(Data), Clean Air Act of 1977, Cooperative agreements.

PB91-233254/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Cost and Effectiveness of Radon Resistant Features in New School Buildings.
Infiltec, Falls Church, VA.
A. B. Craig, K. W. Leovic, and D. W. Saum. 1991, 15p EPA/600/D-91/207
Contract EPA-68-D0-0097
Presented at the ASHRAE Conference, IAQ91 held in Washington, DC. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper describes initial results of a study of several schools with radon resistant features that were recently constructed in the northeastern U.S. These designs generally are based on experience with radon mitigation in existing houses and schools and radon-resistant new construction. The study was limited to slab-on-grade schools where the most common radon resistant school design is active subslab depressurization (ASD). The additional construction costs for eight schools built with ASD ranged from $3 to $11/sq m of slab area. The radon contractors who designed these systems have tended to overdesign the radon reduction systems in the absence of specific written guidance to follow to lessen potential liability in the event of system failure. Design features include detailed sealing of all slab cracks, multiple exhaust stacks, and extensive subslab piping. Recent EPA research on radon mitigation suggests that simpler ASD systems may provide sufficient radon resistance in new build-

ings at lower costs. Components of a specification for radon resistant school construction are discussed, based on comments from radon system designers. Another school being studied was built with a heating, ventilation, and air-conditioning (HVAC) pressurization radon control system, and considerations for this type of system are examined.

Keywords: *Radon, *School buildings, *Air pollution control, *Indoor air pollution, Design criteria, Radioactive materials, Performance evaluation, Environmental engineering, Cost analysis, *Subslab depressurization systems.

PB91-233262/REB PC **A03**/MF **A01**
Long-Range Atmospheric Transport and Deposition of Anthropogenic Contaminants and Their Potential Effects on Terrestrial Ecosystems. Book chapter.
Corvallis Environmental Research Lab., OR.
T. J. Moser, J. R. Barker, and D. T. Tingey. 1991, 18p EPA/600/D-91/208
Pub. in Biogeochemistry and Environmental Change: Global Impacts of Human Activity, 1991. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR.

Through the processes of atmospheric transport and deposition, many anthropogenic contaminants such as industrial organics, pesticides, and trace metals have become widely distributed around the globe. Due to the phenomenon of long-range atmospheric transport, even the most remote areas of the plant are not out of range of contaminants emitted from distant anthropogenic sources. Many of these airborne contaminants are toxic and persistent, can bioaccumulate, and may remain biologically harmful for long periods of time. Although airborne contaminants are considered primarily a human health problem, there is increasing concern that they may have deleterious ecological consequences. When sensitive terrestrial plants and other biota experience chronic exposure to low concentrations of airborne toxic chemicals, sublethal effects may occur, with subsequent impacts on ecosystem structure and function.

Keywords: *Air pollution, *Toxic substances, *Terrestrial ecosystems, *Atmospheric diffusion, *Deposition, Biological effects, Air pollution effects(Plants), Environmental effects, Pollution sources, Global aspects, Industrial wastes, Organic compounds, Pesticides, Trace amounts, Metals, Bioaccumulation.

PB91-233270/REB PC **A03**/MF **A01**
Forestation and Forest Management Options and Their Costs at the Site Level. Symposium paper.
Corvallis Environmental Research Lab., OR.
R. K. Dixon, J. K. Winjum, and O. N. Krankina. 1991, 18p EPA/600/D-91/209
Presented at the Technical Workshop to Explore Options for Global Forest Management held in 1991.

Sustainable silvicultural practices are required to ensure an uninterrupted and affordable flow of goods and services from the Earth's 4,070 million hectares of forests. Demographic and environmental pressures have altered the status and development of boreal, temperate, and tropical forest biomes. A relatively small proportion of primary or secondary forests are routinely managed on a sustainable basis. Forestation of harvested stands, degraded or abandoned lands, and other sites in boreal, temperate and tropical systems range from 10-15 million hectares annually. The cost of natural and artificial forestation range from $30-2500/hectare, depending on site condition and preparation, size/quality of seeds, seedlings or advanced regeneration, and juvenile plantation protection requirements. Intermediate silvicultural practices such as thinning, fertilization, drainage, or irrigation range in cost from $5-500/hectare. Protection of forests from fire, insects, and disease range from $<1-50/hectare. Financial analyses of silvicultural practices reveal that these forest systems can be managed profitably. Case studies of selected forest management investments in representative countries reveal an internal rate of return of 5-35%. Sustained management of global forest will probably not increase significantly without policy changes to stimulate positive national action and create incentives for local populations.

Keywords: *Climatic changes, *Forest management, *Forestry, *Air pollution effects(Plants), *Economic analysis, Planting management, Carbon cycle, Biomes, Biomass plantations, Ecosystems, Environmental effects, Land use, Resource conservation, Biosphere, Global.

PB91-233288/REB PC **A03**/MF **A01**
Practical Computer Modeling for GAC Application.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
T. F. Speth, and R. J. Miltner. 1991, 13p EPA/600/D-91/210

The 1986 amendments to the Safe Drinking Water Act (SDWA) declare granular activated carbon (GAC) to be the base-line technology against which all other technologies must be measured for synthetic organic chemical (SOC) control. The USEPA's Drinking Water Research Division (DWRD) has been active in determining the effectiveness of GAC in removing organic contaminants. Because GAC is typically employed in a fixed-bed reactor, treatment efficiency is best described by pilot or full-scale columns evaluated with the contaminated water in question. Because it is expensive and time consuming to conduct full-scale field studies, predictive computer modeling of GAC systems is an inherent part of the USEPA's Cost and Technology documents which support the SDWA. The article discusses the mathematical models used by the DWRD and the USEPA's Office of Drinking Water (ODW) to evaluate SOC control in natural waters by GAC treatment processes.

Keywords: *Granular activated carbon treatment, *Computerized simulation, *Water pollution control, *Organic compounds, Adsorption, US EPA, Performance evaluation, Baseline measurements, Water treatment, Potable water, Synthetic materials, Technology utilization, Reprints, Safe Drinking Water Act.

PB91-233296/REB PC **A02**/MF **A01**
Evaluation and Testing of a Protocol to Determine the Aerobic Degradation Potential of Hazardous Waste Constituents in Soil.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
S. I. Safferman, J. A. Glaser, and D. Shelton. 1990, 9p EPA/600/D-91/211
Presented at the Air and Waste Management Association Annual Meeting and Exhibition (83rd) held in Pittsburgh, PA. on June 24-29, 1990. Prepared in cooperation with Agricultural Research Service, Beltsville, MD. Beltsville Agricultural Research Center.

The U.S. Environmental Protection Agency (EPA) in conjunction with the U.S. Department of Agriculture is currently testing a protocol for determining the 'Aerobic Degradation Potential of Hazardous Organic Constituents in Soil' to ensure its reliability, accuracy, cost effectiveness, and ease of use. This protocol is part of EPA's Office of Research and Development efforts to provide Federal and State EPA offices as well as consultants and industries with guidelines and encouragement for conducting standardized treatability studies. Testing of the protocol has been initiated with standardized soil (obtained from EPA's Synthetic Soil Matrix, Edison, NJ). Two surrogate pollutants, toluene, a volatile, and phenol, a semivolatile, are being tested as representative, easily biodegradable compounds. Critical aspects of the protocol involving the configuration of the test reactor and procedures for trapping the volatiles have been identified. Once fine tuning of the process is completed, testing of combinations of compounds in a variety of soil matrices is planned.

Keywords: *Hazardous materials, *Aerobic processes, *Biological treatment, *Land pollution control, *Waste management, US EPA, US DOA, Soil contamination, Soil treatment, Superfund, Remedial action, *Biodeterioration.

PB91-233304/REB PC **A02**/MF **A01**
Selection of Nutrients to Enhance Biodegradation for the Remediation of Oil Spilled on Beaches.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
S. I. Safferman. 1991, 9p EPA/600/D-91/212
Presented at the 1991 International Oil Spill Conference (Prevention, Behaviour, Control, Cleanup), San Diego, CA., March 4-7, 1991.Portions of this document are not fully legible.

Laboratory studies were conducted to determine the fate of fertilizers proposed for application to the Alaska shoreline in support of the Alaskan Oil Spill EPA Bioremediation Project. Fertilizer application is theorized to provide indigenous organisms with nutrients that appear to be limited on ocean beaches. The experiments were developed strictly to test the durability, release rates, and application procedures of a variety of fertilizer types. The effects of tidal movement on a beach was simulated by two separate conditions, static and dynamic. The static condition represented periods when the beach material was under water and turbulence was at a minimum. This condition was simulated in the laboratory by submerging the nutrient in a beaker of simulated sea water (with or without beach material depending on the nutrients). These experiments ran continuously over a 3-month period with water exchanges in accordance with a planned schedule. Nutrient concentrations were measured in the exchanged water. Dynamic conditions represented the forces on beach material as the water moved from the low to high tide and then back to the low tide. In the laboratory, the condition was simulated by applying the nutrients to beach material, which was piled in one end of a long narrow trayplaced on a rocker table. When the rocker table was operating and sufficient quantities of sea water had been added to cover the beach material (in the rocker table's low position, a gentle sloshing of the water over the materials resulted. These experiments generally lasted 1 to 2 hours during which time liquid samples were collected for nutrient analyses. Durability of the fertilizers was measured by visual observation and freeze/thaw determinations. The experimental setup was economical and performed well. The fertilizer most suited for field trial was found to be isobutyraldehyde diurea briquettes, which produced a slow continuous release of nutrients was found.

Keywords: *Oil spills, *Biological treatment, *Beaches, *Land pollution control, *Fertilizers, *Biodeterioration, Remedial action, Nutrients, Experimental design, Water pollution abatement, Tidal waters, Oil pollution, Reprints, Alaskan Oil Spill EPA Bioremediation Project, Exxon Valdez, Aldehyde diurea/butyr, Slow release chemicals.

PB91-233312/REB PC **A03**/MF **A01**
Risk Assessment (Chapter 15). Book chapter.
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.
L. R. Valcovic. Jul 91, 16p EPA/600/D-91/213, OHEA-R-328
Pub. in Genetic Toxicology, 1991.

The field of genetic toxicology occupies a unique and somewhat paradoxical role in the area of risk assessment. It is the only field in which most of the data generated do not measure truly toxic events. That is, many of the end points measured do not clearly represent adverse effects for the cell or organism of study. The chapter presents a discussion of some of the major components of heritable genetic risk assessment from chemical exposure, including hazard identification, dose-response assessment, dosimetry, dose-response extrapolation, exposure assessment, and risk characterization.

Keywords: *Risk assessment, *Toxicology, *Genetics, *Mutagens, *Toxic substances, Dose-response relationships, Health hazards, Exposure, Gonads, Mammals, Dosimetry, Reprints.

PB91-233320/REB PC **A03**/MF **A01**
Advances in Hazardous Waste Site Alluvial Sampling.
Robert S. Kerr Environmental Research Lab., Ada, OK.
L. E. Leach, and D. C. Draper. 1991, 22p EPA/600/D-91/214
Presented at the Conference on Design and Construction Issues at Hazardous Waste Sites, Dallas, TX., May 1-3, 1991.

Ground-water remediation at hazardous waste sites quite often fails to meet state and federal established goals. In recent pump-and-treat study of 19 active systems, Haley et al (1989) found that most systems had been operated longer than their initial projection for clean-up. Estimates could not be made as to the time remaining for ground water restoration. Inadequate design and failure to evaluate ground-water remedial actions stems from the inability to understand complex processes involved in the transport and transformation of contaminants in the subsurface environment. Paramount to this understanding is an adequate hydrologic, physical, chemical and biological characterization of the subsurface.

Keywords: *Hazardous materials, *Water pollution control, *Ground water, *Waste disposal, *Observation wells, Remedial action, Subsurface investigations, Pumping, Environmental transport, Hydrology, Physical properties, Water chemistry, Aquatic biology, Drill core analysis, Alluvial aquifers, Reprints, *Cleanup operations, Remedial design.

PB91-233338/REB PC **A02**/MF **A01**
Biologically Based Dose Response Models for Developmental Toxicity Risk Assessment.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
R. J. Kavlock. 1991, 10p EPA/600/D-91/215
Presented at the Toxicology Forum held in Aspen, CO. on July 17, 1991.

Present risk assessment procedures for non-cancer endpoints generally rely on the determination of No Observed Adverse Effects levels (NOAELS) in animal models followed by the application of various Uncertainty Factors (UFs) to account for unknowns in extrapolating high dose toxicology studies to potentially sensitive human subpopulations. The Reference Dose (RfD) or Concentration (RfC) which results from the process is an estimate, with an uncertainty spanning an order of magnitude, of the exposure level to the human population that is likely to be without appreciable risk of deleterious effects during a lifetime. The US Environmental Protection Agency, through its Research to Improve Health Risk Assessment Program (RIHRA), has embarked on a concerted effort to introduce more pharmacokinetic and mechanistic information into the risk assessment process for non-cancer endpoints and to do this in a quantitative and predictive fashion. Such approaches are collectively termed biologically based dose-response (BBDR) models, and the presentation will focus on examples of such research in the area of developmental toxicity currently being conducted or supported by the EPA.

Keywords: *Teratogenic compounds, *Toxicity, *Risk assessment, Dose-response relationships, Carcinogenesis, Pharmacokinetics, Growth, Biological models, Embryo, Genetic recombination, Fetus, Health hazards, Mutations.

PB91-233346/REB PC **A04**/MF **A01**
Caveats in Hazard Assessment: Stress and Neurotoxicity.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
D. B. Miller. 1991, 60p EPA/600/D-91/216

A primary aim of neurotoxicology is to identify agents that impact directly or the nervous system with the ultimate goal of identifying any adverse effects associated with exposure. Behavioral, biochemical, electrophysiological and morphological indicators are all suggested as appropriate means for detecting neurotoxicity. A general review of the impact of stress or adrenal axis perturbations on neurotoxicity is provided by the chapter. It illustrates how damage to, chemically-induced alterations in the secretions of, or activation of the adrenal axis may impact on the endpoints used to assess neurotoxicity. Often what are normally considered to be irrelevant variables such as handling, dosing and housing procedure may impact neurotoxicity assessment in both adult and developing organisms. Laboratory animals are not the toxicologist's black box and a better understanding of the changes associated with the procedures utilized in toxicity testing will lead to greater confidence in the data provided by such testing.

Keywords: *Toxicology, *Nervous system, *Stress(Physiology), *Health hazards, Adrenal gland, Hypothalamus, Hippocampus, Glucocorticoids, Animal behavior, Cognition, Memory, Electrophysiology, Biochemistry.

PB91-233353/REB PC **A03**/MF **A01**
Assessment of Neurobehavioral Response in Humans to Low-Level Volatile Organic Compound (VOC) Sources.
Health Effects Research Lab., Research Triangle Park, NC. Human Studies Div.
D. A. Otto. Jun 91, 29p EPA/600/D-91/218
Proceedings of the Pierce/Yale Indoor Air Conference.

Occupants of sick buildings often complain of CNS symptoms including headache and memory loss, but little objective evidence of neurobehavioral effects exists. Available evidence of neurobehavioral effects of low level VOC exposure representative of new buildings is reviewed. Methods suitable for studying the neurobehavioral effects of low-level VOC exposure--including computerized behavioral tests, balance tests and sensory evoked potentials--are reviewed. The use of computerized behavioral tests in conjunction with symptom questionnaires is recommended for low-level VOC studies.

Keywords: *Indoor air pollution, *Air pollution effects(Humans), *Occupational safety and health, *Toxic substances, *Nervous system disorders, *Buildings, Behavior disorders, Volatile organic compounds, Assessments, Occupational exposure, Reviews, Concentration(Composition), Questionnaires.

PB91-233361/REB PC **A03**/MF **A01**
Reliability Study of the U.S. EPA's Method 101A: Determination of Particulate and Gaseous Mercury Emissions.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
F. W. Wilshire, J. E. Knoll, T. E. Ward, and M. R. Midgett. c1991, 14p EPA/600/D-91/219

EPA Method 101A applies to the determination of particulate and gaseous mercury emissions from sewage sludge incinerators and other sources. Concern has been expressed that ammonia or hydrogen chloride (HC1) when present in the emissions, interferes in the analytical processes and produces a high positive bias in the mercury results. Because HCl and ammonia are present in the effluents from municipal waste incinerators where chlorinated plastics are combusted, the present laboratory study was conducted to investigate these concerns. A standard EPA Method 101A sampling train was employed in the study. The source of Hg vapor consisted of two certified Hg permeation tubes. The mercury vapor was directed into a stream of filtered laboratory air and sampled at rates varying between 15 and 30 L/min. Approximately 1 m3 of gas was collected in each sample run. A side stream of ammonia vapor was added to the gas sampled in half of the runs to determine the effects of that substance. Mercury recoveries with and without added ammonia were 97.3 + or - 3.4 and 96.8 + or - 1.3%, respectively. Application of the Aspin-Welch test for the difference between two sample means showed that the difference was not statistically significant. The effect of added HCl was also studied. Mercury and HCl were added to samples of the acid permanganate reagent and subjected to the Method 101A analytical procedure. Mercury recoveries were 100.0 + or - 5.2, 101.3 + or - 8.5, and 98.0 + or - 5.4% for 0, 1, and 7 g of added HCl, respectively, indicating no effect of HCl on the analysis.

Keywords: *Mercury(Metal), *Vapors, *Particulates, Incinerators, Reliability, Interfering elements, Ammonia, Hydrogen chloride, *EPA Method 101A.

PB91-233379/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
Subacute and Subchronic Oral Toxicity of 'p'-Chlorotoluene in the Rat. Journal article.
Hazleton Labs. America, Inc., Rockville, MD.
J. B. Terrill, M. Robinson, G. W. Wolfe, and L. H. Billups. c1990, 11p EPA/600/J-90/537
Contract EPA-68-03-4008
Pub. in Jnl. of American College of Toxicology, v9 n5 p487-495 Nov 90. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.

P-Chlorotoluene was administered by gavage for 14 and 90 days to male and female Sprague-Dawley-derived rats at dose levels of 200, 600 and 1800 mg/kg/day and 50, 200 and 800 mg/kg/day, respectively. In the 14-day study 8 of 10 animals of each sex in the high-dose group died due to treatment. Other treatment-related signs for these animals included an adverse effect upon body weight, and clinical signs of salivation, tremors and prostration. In the 200 and 600 mg/kg/day groups there were no apparent treatment-related effects. In the 90-day study, 4 of 10 males and 2 of 10 females in the high-dose group died due to treatment. Other signs for this treatment group included an adverse effect upon body weight, and clinical signs of languid behavior, prostration, tremors, sensitive to touch, epistaxis and respiratory distress. Increases in alkaline phosphatase and creatinine (males only), and increases in adrenal (absolute and relative, females), kidney (relative, both sexes) and liver (relative, both sexes) weights were also noted.

Keywords: *Toxicity, Rats, Dose-response relationships, Body weight, Alkaline phosphatase, Creatinine, Adrenal gland, Kidney, Liver, Pathology, Males, Females, Chronic kidney diseases, Organ weight, Reprints, *p-Chlorotoluene.

PB91-233387/REB PC **A03**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Estimation of Free Hydrocarbon Volume from Fluid Levels in Monitoring Wells. Journal article.
Virginia Polytechnic Inst. and State Univ., Blacksburg. Center for Environmental and Hazardous Material Studies.
R. J. Lenhard, and J. C. Parker. c1990, 13p EPA/600/J-90/538
Pub. in Ground Water, v28 n1 Jan-Feb 90. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Under the assumption of local vertical equilibrium, fluid pressure distributions specified from well fluid levels in monitoring wells may be used to predict water and hydrocarbon saturation profiles given expressions for air-water-hydrocarbon saturation-pressure relations. Vertical integration of the oil-saturation profile yields the actual oil volume in porous media per unit area adjacent to the well. Three-phase fluid distributions are predicted using a scaling procedure which requires knowledge of two-phase air-water saturation-pressure relations, hydrocarbon density, and hydrocarbon surface tension. Results reveal that whereas the distance above an oil-water table at which oil saturations become zero may be independent of soil type, estimated light nonaqueous phase liquid (LNAPL) volumes per unit area may differ substantially. Hence, estimates of LNAPL volume cannot be inferred directly from soil LNAPL thickness or well LNAPL thickness data without consideration of effects of soil properties. Furthermore, it is demonstrated that no simple linear conversion scheme can be employed to relate the height of LNAPL in a monitoring well to the LNAPL volume in porous media. Effects of grain-size distribution and well LNAPL thickness on the ration of actual LNAPL thickness in the aquifer to well LNAPL thickness are shown.

Keywords: *Hydrocarbons, *Observation wells, *Ground water, *Water pollution sampling, Oil spills, Underground storage, Storage tanks, Vertical motion, Particle size distribution, Density(Mass/volume), Aquifers, Saturation, Remedial action, Fluid boundaries, Land pollution, Environmental transport, Fluid pressures, Reprints, *Light NonAqueous Phase Liquid.

PB91-233395/REB PC **A02**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
Localization of the Mouse Thymidine Kinase Gene to the Distal Portion of Chromosome 11. Journal article.
Florida Inst. of Tech., Melbourne. Dept. of Biological Sciences.
J. Hozier, J. Scalzi, J. Sawyer, N. Carley, and M. Applegate. c1991, 6p EPA/600/J-91/177
Pub. in Genomics 10, p827-830 May 91. Prepared in cooperation with Applied Genetics Labs., Inc., Melbourne, FL, and Burroughs Wellcome Co., Research Triangle Park, NC. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.

The authors report the cytogenetic mapping of the thymidine kinase (tk-1) gene in the mouse using two complementary and independent analyses: (1) investigation of chromosome aberrations associated with tk-1 gene inactivation in the L5178Y TK(+/-) -3.7.2C cell line, and (2) fluorescence in situ molecular hybridization of cloned tk-1 cDNA probes to mitotic chromosomes of the cell line. The consensus location from both analyses is 11E1-E2. Consideration of the mouse tk-1 gene localization, along with evidence that the homologous human TK1 gene is located distally on the large arm of chromosome 17, appears to extend the region of homology between MMU11 and HSA17 to the distal end of both chromosomes. (Copyright (c) 1991 by Academic Press, Inc.)

Keywords: *Chromosomes, *Thymidine kinase, Deoxyribonucleic acids, Mitosis, Chromosome mapping, Nucleic acid hybridization, Chromosome aberrations, Nucleic acid sequence homology, Karyotyping, Immunohistochemistry, Fluorescence, Reprints.

PB91-233403/REB PC **A03/MF A01**
Glutamate Neruotoxicity in the Developing Rat Cochlea: Physiological and Morphological Approaches. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
R. Janssen, L. Schweitzer, and K. F. Jensen. c1991, 12p EPA/600/J-91/054
Pub. in Brain Research, v552 n2 p255-264 1991. Prepared in cooperation with Louisville Univ., KY. School of Medicine.

The neurotoxic effects of exogenous glutamate were studied in the rat cochlea. Glutamate-treated rats (4g/kg/day ip, postnatal days 2 through 9) exhibited electrophysiologically-measured elevations in high frequency thresholds usually associated with hair cell loss in the basal region of the cochlea. While surface preparations of the organ of Corti revealed no loss of hair cells, there was a dramatic and selective reduction of neurons in the basal, high frequency-related portion of the spiral ganglion. The sensitivity of developing spiral ganglion cells to the neurotoxicity of glutamate is consistent with the hypothesis that glutamate or a structurally related substance is a neurotransmitter at afferent synapses of cochlear hair cells.

Keywords: *Toxicity, *Nervous system, *Cochlea, *Glutamates, Ganglia, Afferent neurons, Synapses, Neuroregulators, Rats, Body weight, Hair cells, Physiology, Morphology, Reprints.

PB91-233411/REB PC **A03/MF A01**
Ten- and Ninety-Day Toxicity Studies of 1,2-Dichlorobenzene Administered by Oral Gavage to Sprague-Dawley Rats. Journal article.
Health Effects Research Lab., Cincinnati, OH.
M. Robinson, J. P. Bercz, H. P. Ringhand, L. W. Condie, and M. J. Parnell. c1991, 32p EPA/600/J-91/178
Pub. in Drug and Chemical Toxicology, v14 n1-2 p83-112 Mar 91. Prepared in cooperation with Army Dugway Proving Ground, UT., and Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.

Subacute (10-day) and subchronic (90-day) toxicity studies of 1,2-dichlorobenzene (DCB) were conducted in male and female Sprague-Dawley rats. 1,2-Dichlorobenzene was administered in corn oil by oral gavage; control animals received corn oil. At time of sacrifice, gross necropsies were performed and selected tissues were weighed and prepared for histological evaluation. Blood was taken for hematology and clinical chemistry determinations. While there were no definitive dose-related histopathological findings in the subacute study, the data did show a tendency toward an increased frequency of hepatocellular cytoplasmic alterations and vacuolization, and single cell necrosis. In the subchronic study, hepatocellular changes associated with treatment included centrolobular degeneration and hypertrophy, and single cell necrosis in the high dose males and females. Correlating effects observed in clinical chemistry and histopathology with other studies, demonstrate that the liver and kidney are the target organs of 1,2-dichlorobenzene toxicity in the rat.

Keywords: *Toxicity, *Health hazards, Dose-response relationships, Liver, Vacuoles, Necrosis, Kidney, Hematology, Pathology, Solvents, Rats, Body weight, Organ weight, Environmental pollutants, Reprints, *Dichlorobenzenes.

PB91-233429/REB PC **A02/MF A01**
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
Fetal Dexamethasone Exposure Impairs Cellular Development in Neonatal Rat Heart and Kidney: Effects on DNA and Protein in Whole Tissues. Journal article.
Duke Univ. Medical Center, Durham, NC. Dept. of Pharmacology.
T. A. Slotkin, F. J. Seidler, R. J. Kavlock, and J. V. Bartolome. c1991, 7p EPA/600/J-91/179
Grant EPA-R-813769
Pub. in Teratology 43, n4 p301-306 Apr 91. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.

Fetal glucocorticoid exposure causes postnatal growth retardation. To examine the mechanisms underlying effects on specific organ systems, the authors administered 0.2 or 0.8 mg/kg of dexamethasone to pregnant rats on gestational days 17, 18, and 19 and assessed three biochemical markers of cell development in heart and kidney of the offspring: DNA content per organ as an index of total cell numbers, DNA per g tissue as an index of cell packing density, and protein/DNA ratio as an index of relative cell size. In both tissues, DNA content became markedly subnormal during the first postnatal week, theontogenetic period of rapid cell division. Partial recovery occurred by the end of the first postnatal month. In the heart, cell packing density was subnormal initially and the cells were significantly enlarged. In contrast, packing density was slightly elevated in the kidney; protein/DNA was increased by the low dose of dexamethasone, but markedly decreased by the high dose. (Copyright (c) 1991 Wiley-Liss, Inc.)

Keywords: *Dexamethasone, *Prenatal exposure delayed effects, *Heart, *Kidney, *Deoxyribonucleic acids, *Toxicity, *Proteins, Glucocorticoids, Fetus, Rats, Mitosis, Reprints.

PB91-233437/REB PC **A02/MF A01**
Measurement of Mutagenic Emissions from the Incineration of the Pesticide Dinoseb during Application of Combustion Modifications. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Genetic Bioassay Branch.
D. M. DeMarini, V. S. Houk, J. Lewtas, R. W. Williams, and M. G. Hishioka. c1991, 6p EPA/600/J-91/180
Pub. in Environmental Science and Technology, v25 n5 p910-913 May 91. Prepared in cooperation with Environmental Health Research and Testing, Inc., Durham, NC., Battelle Columbus Div., OH., and Acurex Corp., Research Triangle Park, NC.

The incineration of the pesticide dinoseb with staged combustion and reburning reduced not only the NOX by 96% compared to the absence of these two control technologies, but also the mutagenic potency of the emissions were reduced by 60% and the mutagenic emission factor by 60% compared to that of staged combustion alone. Although chemical analysis for a variety of nitroaromatics indicated the presence of only a few such compounds at appreciable levels, mutagenicity bioassays suggested that 70-90% of the mutagenic activity of the dichloromethane-extractable organics in the emissions may be due to nitroaromatics. Therefore, optimization of combustion conditions to reduce NOX emissions from fuels high in nitrogen, although desirable in itself, may lead to the formation of as-yet unidentified nitrated species. Thus, staged combustion and reburning appear to be effective technologies for reducing NOX and minimizing the mutagenic activity of the emissions resulting from the incineration of a nitrogen-containing hazardous waste. This study also illustrates the value of performing both chemical and biological analyses of chemically complex mixtures, such as incinerator emissions, in order to characterize the potential health effects of such mixtures.

Keywords: *Air pollution abatement, *Emission factors, *Waste disposal, *Dinoseb, *Air pollution detection, Herbicides, Afterburning, Staged combustion, Air pollution effects(Humans), Mutagens, Toxic substances, Nitrates, Chemical analysis, Bioassay, Nitrogen oxides, Hazardous materials, Combustion modification, Reprints.

PB91-233445/REB PC **A03/MF A01**
Immunotoxicologic Assessment of Subacute Exposure of Rats to Carbon Tetrachloride with Comparison to Hepatotoxicity and Nephrotoxicity. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
R. J. Smialowicz, J. E. Simmons, R. W. Luebke, and J. W. Allis. c1991, 12p EPA/600/J-91/181
Pub. in Fundamental and Applied Toxicology 17, n1 p186-196 1991.

The immunotoxicity, hepatotoxicity, and nephrotoxicity of subacute exposure to carbon tetrachloride (CCl4) were evaluated in young adult (8-9 weeks old) male Fischer 344 rats dosed by gavage with CCl4 for 10 consecutive days at 0, 5, 10, 20 or 40 mg/kg/day. Two days following the last treatment rats were evaluated for alterations in immune function by monitoring the following: body and lymphoid organ weights; mitogen and mixed leukocyte reaction lymphoproliferative responses; natural killer cell activity; and cytotoxic T lymphocyte responses. A separate group of similarly dosed rats was immunized with sheep red blood cells (SRBC) on Day 9 of dosing, and the primary antibody response was assessed 4 days later. Hepatic and renal toxicity were assessed 2 days after the last treatment by monitoring organ weights, serum indicators of hepatic and renal damage, and hepatic cytochrome P450 levels, as well as by histological evaluation. Significant increases in relative liver weights were observed in rats dosed at 40 mg/kg/day. Histologically, these livers displayed mild to moderate vacuolar degeneration and minimal to mild hepatocellular necrosis. In addition, serum levels of aspartate aminotransferase and alanine aminotransferase were elevated at this dosage, as well as at 20 mg/kg/day. (Copyright (c) 1991 by the Society of Toxicology.)

Keywords: *Carbon tetrachloride, *Liver, *Kidney, *Toxicology, *Immune system, Rats, Dose-response relationships, Antibodies, Body weight, Natural killer cells, Spleen, Thymus gland, Cytochrome p-450, Alanine aminotransferase, Aspartate aminotransferase, Reprints.

PB91-233452/REB PC **A03/MF A01**
Health Effects Research Lab., Research Triangle Park, NC.
Investigations of Amitraz Neurotoxicity in Rats. 4. Assessment of Toxicity Syndrome Using a Functional Observational Battery. Journal article.
NSI Technology Services Corp., Research Triangle Park, NC.
V. C. Moser. c1991, 12p EPA/600/J-91/182
Contract EPA-68-02-4450
Pub. in Fundamental and Applied Toxicology 17, n1 p7-16 Jul 91. See also PB91-109470. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

A functional observational battery (FOB) was utilized to provide a semiquantitative description of the hyperactivity, excitability, and debilitation produced by amitraz. Adult male Long-Evans rats were administered either vehicle or 10, 25, 50, 100, or 200 mg/kg amitraz ip. They were tested with the FOB immediately before dosing, at 1 and 4 hr, and at 1, 2, 4, and 8 days after dosing. Higher doses (100-200 mg/kg) produced increased reactivity to manipulation, tenseness, and aggression. Most or all doses produced depressed arousal and rearing activity, hypothermia, body weight loss, and autonomic changes including ptosis, chromodacryorrhea resulting in facial crustiness, loss of the pupil reflex, and decreased defecation. Altered gait and decreased landing foot splay were also produced by amitraz. For the most part, effects of lower doses (10-50 mg/kg) were reversible by 2 to 4 days after treatment. In the higher dose groiups, however, signs of toxicity were evident, and in some cases even more prominent (e.g., handling hyperreactivity), 8 days after a single dose of amitraz. The FOB thus provided a semiquantitative description of the magnitude and time course of many features of the amitraz toxicity syndrome. (Copyright (c) 1991 by the Society of Toxicology, All rights of reproduction in any form reserved.)

Keywords: *Toxicity, *Nervous system, *Pesticides, Rats, Animal behavior, Body weight, Dose-response relationships, Light, Body temperature, Reprints, *Amitraz.

PB91-233460/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
PC-BEIS: A Personal Computer Version of the Biogenic Emissions Inventory System. Interim rept.
Computer Sciences Corp., Research Triangle Park, NC.
T. E. Pierce, and P. S. Waldruff. c1991, 7p EPA/600/J-91/183
Contract EPA-68-01-7365
Pub. in Jnl. of Air and Waste Management Association, v41 n7 p937-943 Jul 91. See also PB91-136549. Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Sponsored by Environmental Protection Agency,

Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The U.S. Environmental Protection Agency's Biogenic Emissions Inventory System (BEIS) has been adapted for use on IBM and IBM-compatible personal computers (PCs). PC-BEIS estimates hourly emissions of isoprene, alpha-pinene, other monoterpenes, and unidentified hydrocarbons for any county in the contiguous United States. To run the program, users must provide hourly data on ambient temperature, relative humidity, wind speed, cloud cover, and a code that identifies the particular county. The paper provides an overview of the method used to calculate biogenic emissions, shows an example application, and gives information on obtaining a copy of the program. (Copyright (c) 1991--Air & Waste Management Association.)

Keywords: *Natural emissions, *Air pollution, *Computerized simulation, Humidity, Data base management, Atmospheric temperature, Wind velocity, Cloud cover, Non-methane hydrocarbons, United States, Terpene hydrocarbons, Plants(Botany), Reprints, *Biogenic Emissions Inventory System, *Emission inventories, IBM computers.

PB91-233478/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Thermal Decomposition of Peroxyacetyl Nitrate and Reactions of Acetyl Peroxy Radicals with NO and NO2 Over the Temperature Range 283-313 K. Journal article.
California Univ., Riverside. Statewide Air Pollution Research Center.
E. C. Tuazon, W. P. L. Carter, and R. Atkinson. c1991, 6p EPA/600/J-91/184
Grant EPA-R-815699-01
Pub. in Jnl. of Physical Chemistry, v95 n6 p2434-2439 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The thermal decomposition of peroxyacetyl nitrate (PAN) in NO-NO2-air (or N2) mixtures has been studied at 740 torr total pressure over the temperature range 283-313 K. The experimental data obtained yield a rate constant k3 for the thermal decomposition of PAN of k3 = 2.52 x 10(16) exponent (-13573/T) per sec and a rate constant ratio for the reactions of the CH3C(O)OO(dot) radical with NO2 (k1) and NO (k2) of k2/k1 = 1.95 + or - 0.28, independent of temperature over the range 283-313 K. These data are compared and discussed with other literature data. (Copyright (c) 1991 American Chemical Society.)

Keywords: *Peroxy esters, *Nitrates, *Reaction kinetics, *Pyrolysis, Free radicals, Air pollution, Temperature dependence, Reprints, *Peroxyacetyl nitrate.

PB91-233486/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Development of Impact-Oriented Climate Scenarios. Journal article.
North Carolina Univ. at Chapel Hill. Dept. of Geography.
P. J. Robinson, and P. L. Finkelstein. c1991, 12p EPA/600/J-91/185
Pub. in Bulletin of the American Meteorological Society, v72 n4 p481-490 Apr 91. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Appropriate scenarios of future climate must be developed prior to any assessment of the impacts of climate change. The information needed by impact assessors was examined in consultation with those having experience in scenario use. Most assessors require regional scenarios with a temporal resolution of one day and a spatial resolution of around 100 km. Scenarios should contain one or more of: (1) general descriptive statistics of the major climate elements, (2) information about climatic anomalies such as drought, (3) statistics on the frequency and probability of events exceeding particular thresholds, and (4) general synoptic information. Techniques of climate analysis currently available were reviewed for their suitability to meet these scenario needs. The techniques were divided into a series of modules, groups of similar analysis techniques providing a scientifically sound piece of required information. A series of linked modules then provides the complete scenario. One set of modules emphasizes process models, another set uses empirical analyses. The final set involves linkage between the other two. For each module the needs and opportunities for research directed towards scenario development are discussed. (Copyright (c) 1991 American Meteorological Society.)

Keywords: *Climatic changes, *Environmental impact assessments, *Air pollution, Meteorology, Scenarios, Ecosystem, Temporal distribution, Spatial disribution, Global aspects, Statistical analysis, Droughts, Mathematical models, Forecasting, Trends, General circulation models, Atmospheric chemistry, Reprints.

PB91-233494/REB PC **A03/MF A01**
Evaluation of the TUPOS Air Quality Dispersion Model Using Data from the Epri Kincaid Field Study. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
D. B. Turner, L. W. Bender, J. O. Paumier, and P. F. Boone. c1991, 17p EPA/600/J-91/186
Pub. in Atmospheric Environment, v25A n10 p2187-2201 1991. Prepared in cooperation with Computer Sciences Corp., Research Triangle Park, NC.

Data from SF6 tracer studies conducted at the Kincaid power plant in central Illinois by the Electric Power Research Institute in 1980 and 1981 have been used to evaluate the TUPOS air quality dispersion model. Most of the 96 hours' data are from periods representing daytime convective conditions when the impact of an elevated buoyant source would be expected to be greatest at ground level. Since on the order of 200 tracer measurement stations on four to six arcs were in operation during each hour of the study, a reasonable estimate of the maximum concentration along each arc could be made. The maximum concentration on each arc was the principal value used for purposes of comparing tracer measurements with model estimates. In addition to making comparisons between tracer and TUPOS estimates, comparisons were also made using the model MPTER. Although the means of residuals from the hourly maxima are not statistically different at the 95% confidence level for these two models, the TUPOS shows subjective improvement. The performance results were used to suggest further changes to the TUPOS model. These consisted primarily of determining the fluctuation statistics and wind speed and direction for a height midway between effective plume height and ground-level rather than at plume height. These changes were implemented and shown to provide improvement when tested on the dependent data set used to evaluate the original model. The mean of the residuals (model concentration minus tracer concentration) of 7.9 ppt (parts per trillion) for the revised model was found using a t test to be significantly different at the 95% confidence level from the mean of residuals for the original model of -13.1 ppt. This was from using all data for all arcs for all hours (580 data pairs). This shifts from underestimation of the concentration for the original model to slight overestimation with the revised model. Although the significance of the results for the revised model are not as great as they would be if an independent data set were used, these results are still useful in indicating the proper direction of changes to be made that can improve modeling.

Keywords: *Gaussian plume models, *Atmospheric diffusion, *Air quality, *Air pollution forecasts, *Mathematical models, Data processing, Performance evaluation, Study estimates, Tracer studies, Environmental transport, Air pollution sampling, Concentration(Composition), Comparison, Revision, Field tests, Reprints, *TUPOS model, Phase turbulence profile sigmas, Kincaid power plant, Central Region(Illinois), Electric Power Research Institute, MPTER model.

PB91-233502/REB PC **A02/MF A01**
Empirical Method to Predict Solubility in Supercritical Fluids. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
S. Mitra, and N. K. Wilson. c1991, 7p EPA/600/J-91/187
Pub. in Jnl. of Chromatographic Science, v29 p305-309 Jul 91.

The ability to predict the solubility of analytes in supercritical fluids is important in understanding supercritical fluid extraction (SFE) and supercritical fluid chromatography (SFC). In SFE, an analyte must dissolve in the supercritical solvent before it can be extracted. In SFC, the retention behavior of an analyte can be predicted once its solubility characteristics are known. Thermodynamic methods using a phase equilibrium approach have been used in the past to predict solubility in supercritical fluids. These methods usually involve complicated calculations and need some experimental data to compute unknown parameters. The authors have developed simple empirical methods for predicting solubility in supercritical fluids as a function of the prevailing temperature, pressure and density.

Keywords: *Supercritical state, *Fluids, *Empirical equations, *Solubility, Supercritical fluid chromatography, Organic compounds, Pressure, Temperature, Density(Mass/volume), Carbon dioxide, Water, Ethylene, Ethane, Reprints.

PB91-233510/REB PC **A03/MF A01**
Spatial Distribution of Precipitation Seasonality in the United States. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
P. L. Finkelstein, and L. E. Truppi. c1991, 15p EPA/600/J-91/188
Pub. in Jnl. of Climate, v4 n4 p373-377 Apr 91.Color illustrations reproduced in black and white.

A detailed, long term portrait of the seasonality of precipitation over the United States is developed using a 90 year climate division record. Decadal maps of seasonality are also presented, and their variability over time considered. Model output from four GCMs are analyzed with respect to precipitation seasonality over the same area, both for present conditions, and for a doubled CO2 climate. Comparison of model output to present patterns suggests that in most cases the models are doing reasonably well in matching regional details of seasonality. For the future climate, there is some agreement among models suggesting a trend toward a spring, rather than summer precipitation maximum in the mid-continental areas of the U.S.

Keywords: *Seasonal variation, *Precipitation(Meteorology), *General circulation model, *Carbon dioxide, *Climates, *Air pollution, Long term effects, Spatial distribution, Mathematical models, Regional analysis, Trends, Rainfall, United States, Greenhouse effect, Global warming, Climatic changes, Reprints.

PB91-233528/REB PC **A03/MF A01**
Sensitivity of Regional Ozone Modeling to Biogenic Hydrocarbons. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
S. J. Roselle, T. E. Pierce, and K. L. Schere. c1991, 26p EPA/600/J-91/189
Pub. in Jnl. of Geophysical Research, v96 nD4 p7371-7394, 20 Apr 91.

The sensitivity of regional ozone concentrations to biogenic hydrocarbons in the Northeastern U.S. is examined. A six day period from July 1980 is simulated with an Eulerian grid photochemical model having a horizontal resolution of 19 km, using detailed estimates of biogenic NMHC emissions. Overall, biogenic emissions are on the same order of magnitude as anthropogenic emissions. Approximately 33% of the biogenics inventory is in the form of isoprene, with the remainder of the NMHC in the form of monoterpenes and unidentified NMHC. An analysis of three model sensitivity runs in which biogenic emissions, and then anthropogenic hydrocarbon emissions, were selectively removed from the emissions data set, showed that the relative impact of biogenic compared to anthropogenic hydrocarbons on ozone generation varied spatially over the model domain. The biogenic influence on ozone was greatest in western and southern sections of the domain, and anthropogenic influence was greatest in the urbanized Northeast Corridor and industrial Great Lakes area.

Keywords: *Ozone, *Mathematical models, *Natural emissions, *Air pollution, *Hydrocarbons, Non-methane hydrocarbons, Spatial distribution, Study estimates, Mathematical models, Regional analysis,

Concentration(Composition), Biosphere, Reprints, Northeast Region(United States), Regional Oxidant Model.

PB91-233536/REB PC **A02**/MF **A01**
Optimizing Sensitivity of SIM Mode of GC/MS Analysis for EPA's TO-14 Air Toxics Method. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
J. D. Pleil, T. L. Vossler, W. A. McClenny, and K. D. Oliver. c1991, 9p EPA/600/J-91/190
Pub. in Jnl. of the Air and Waste Management Association, v41 n3 p287-295 Mar 91. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC., and Northrop Services, Inc., Research Triangle Park, NC.

Guidelines for the determination of volatile organic compounds (VOCs) at ambient levels in air are published in Method TO-14 of the U.S. Environmental Protection Agency's 'Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air.' To achieve the sensitivity required for sub-part-per-billion-by-volume (ppbv), determinations of VOCs, TO-14 recommends selective ion monitoring (SIM) mode of operation when a conventional quadrupole mass spectrometer is used as the analytical finish. The paper discusses the implementation of SIM mode of analysis and presents the rationale and methods for optimization of the SIM parameters for maximum sensitivity when analyzing whole air samples for trace-levels of targeted VOCs. (Copyright (c) 1991--Air and Waste Management Association.

Keywords: *Volatile organic compounds, *Optimization, *Sensitivity, *Gas chromatography, *Mass spectroscopy, Air pollution, Toxic substances, Reprints, *EPA Method TO-14, Selective ion monitoring.

PB91-233544/REB PC **A02**/MF **A01**
Comparison of Portable Gas Chromatographs and Passivated Canisters for Field Sampling Airborne Toxic Organic Vapors in the United States and the USSR. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
R. E. Berkley, J. L. Varns, and J. Pleil. c1991, 8p EPA/600/J-91/191
Pub. in Environmental Science and Technology, v25 n8 p1439-1444 Aug 91.

Collection of samples in passivated canisters is widely used for analysis of trace volatile organic compounds in air because a preconcentration step is usually required prior to analysis. Sample integrity can be compromised by deterioration or artifact formation during storage and preconcentration. A laboratory-tested portable gas chromatograph (PGC) equipped with a highly-sensitive photoionization detector (PID) offers the advantage of near real-time data without preconcentration, but its limitations as a field-portable instrument must be recognized. The paper presents data produced simultaneously by the Canister/TO-14 method and PGCs. They were obtained in U.S. and overseas field studies, at industrial, hazardous waste, and roadway sites. Field results suggest that a combination of canister and PGC methods offers a synergistic approach to source assessment measurements.

Keywords: *Air pollution monitoring, *Gas chromatography, *Portable equipment, *Comparison, Air sampling, United States, USSR, Stationary sources, Performance evaluation, Organic compounds, Toxic substances, Reprints, *Passivated canisters.

PB91-233551/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Nested Grid Mesoscale Atmospheric Chemistry Model. Journal article.
State Univ. of New York at Albany. Atmospheric Sciences Research Center.
J. E. Pleim, J. S. Chang, and K. Zhang. c1991, 22p
Contract EPA-68-D-80016
Pub. in Jnl. of Geophysical Research, v96 nD2 p3065-3084, 20 Feb 91. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

A nested grid version of the Regional Acid Deposition Model (RADM) has been developed. The horizontal grid interval size of the nested model is 3 times smaller than that of RADM (80/3 km = 26.7 km). Therefore the nested model is better able to simulate mesoscale atmospheric processes while maintaining consistency with larger-scale features. The nested model uses dynamic boundary conditions along inflow boundaries which are interpolated from coarse grid model (RADM) results. Since the nesting is one-way, the outflow boundary conditions are specified to minimize numerical reflections. Three-day wet deposition amounts of sulfate and nitrate simulated by the nested grid version of RADM as well as the coarse grid version were compared to measurements made by the regional scale network during the Oxidizing and Scavenging Characteristics of April Rains (OSCAR) IV experiment. Both models were able to predict wet depositions of sulfate to within a factor of 2 for over 80% of the sampling sites. Nitrate predictions were slightly worse with just over 70% of the pairs within a factor of two for both models. Although the nested grid model showed no improvement over the coarse grid model in terms of point by point comparisons, it did demonstrate the ability to predict a more realistic range and spatial variability of wet deposition amounts. Plots of predicted deposition fields show that the nested model predicted values similar to the observations in their vicinity more often than did the coarse grid model. Nested model simulations of wet deposition were also compared to measurements made by a high density sampling network over a 110 x 110 km area of northeastern Indiana. Most of the spatial features of the observed distribution were well simulated by the model demonstrating the nested model's ability to resolve processes on scales which are subgrid to the coarse grid model. The predictions of wet depositions by both models were in better agreement with observations than were predictions of precipitation. Since the OSCAR IV experiment was characterized by very efficient washout, the rate of wet deposition was often primarily controlled by the rate of supply of airborne material to the precipitating system rather than aqueous oxidation and precipitation processes. Therefore, errors in precipitation rate had little impact on wet deposition predictions. (Copyright (c) 1991 by the American Geophysical Union.)

Keywords: *Acid rain, *Mathematical models, Atmospheric chemistry, Forecasting, Mesoscale phenomena, Sulfates, Nitrates, United States, Reprints, *Regional Acid Deposition Model, Wet deposition.

PB91-233569/REB PC **E99**/MF **E99**
Hazardous Waste TSDF: Background Information for Proposed RCRA Air Emission Standards.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Jun 91, 1082p-in 3v
Set includes PB91-233577 through PB91-233593. See also PB90-263880.

No abstract available.

PB91-233577/REB PC **A15**/MF **A03**
Hazardous Waste TSDF: Background Information for Proposed RCRA Air Emission Standards. Volume 1. Chapters 1-8, and Appendices A-C. Final draft rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Jun 91, 339p EPA/450/3-89/023A
See also Volume 2, PB91-233585.
Also available in set of 3 reports PC E99/MF E99, PB91-233569.

Air emission standards are being proposed under the Resource Conservation and Recovery Act for hazardous waste treatment, storage, and disposal facilities (TSDF) to reduce emissions of ozone precursors (volatile organic compounds) and exposures to hazardous air pollutants. The document contains background information and environmental and economic assessments of regulatory alternatives considered in developing the proposed standards. The regulatory alternatives consider application of air pollution controls on tanks, surface impoundments, and containers used to manage hazardous waste at TSDFs, as well as at generators using tanks and containers to accumulate large quantities of waste on site. The document is divided into a three volume set.

Keywords: *Air pollution standards, *Environmental impact statements-Draft, *Hazardous materials, *Waste management, Mathematical models, Environmental effects, Volatile organic compounds, Waste treatment, Waste disposal, Waste storage, Air pollution abatement, Economic impacts, Containers, Surface impoundments, Tanks(Containers), Pollution regulations, Information transfer, Substitutes, Air pollution control, Ozone, *Resource Conservation and Recovery Act.

PB91-233585/REB PC **A15**/MF **A03**
Hazardous Waste TSDF: Background Information for Proposed RCRA Air Emission Standards. Volume 2. Appendices D-F. Final draft rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Jun 91, 350p EPA/450/3-89/023B
See also Volume 1, PB91-233577 and Volume 3, PB91-233593.
Also available in set of 3 reports PC E99/MF E99, PB91-235569.

Air emission standards are being proposed under the Resource Conservation and Recovery Act for hazardous waste treatment, storage, and disposal facilities (TSDF) to reduce emissions of ozone precursors (volatile organic compounds) and exposures to hazardous air pollutants. The document contains source assessment model, estimating health effects, and test data on emission sources as well as the controls. The regulatory alternatives consider application of air pollution controls on tanks, surface impoundments, and containers used to manage hazardous waste at TSDFs, as well as at generators using tanks and containers to accumulate large quantities of waste on site. The document is divided into a three volume set.

Keywords: *Air pollution standards, *Environmental impact statements-Draft, *Hazardous materials, *Waste management, Waste treatment, Waste disposal, Waste storage, Air pollution control, Air pollution abatement, Revisions, Volatile organic compounds, Computerized simulation, Mathematical models, Input/output routines, Risk assessment, Public health, Data processing, Pollution sources, *Resource Conservation and Recovery Act.

PB91-233593/REB PC **A17**/MF **A04**
Hazardous Waste TSDF: Background Information for Proposed RCRA Air Emission Standards. Volume 3. Appendices G-L. Final draft rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Jun 91, 393p EPA/450/3-89/023C
See also Volume 2, PB91-233585.
Also available in set of 3 reports PC E99/MF E99, PB91-233569.

Air emission standards are being proposed under the Resource Conservation and Recovery Act for hazardous waste treatment, storage, and disposal facilities (TSDF) to reduce emissions of ozone precursors (volatile organic compounds) and exposures to hazardous air pollutants. The document contains emission measurement and continuous monitoring; suppression and add-on control device cost estimates; supporting documents for the economic impact analysis; exposure assessment for maximum risk and noncancer health effects; secondary air and cross-media impact estimates; and 90-day tanks and container impacts. The regulatory alternatives consider application of air pollution controls on tanks, surface impoundments, and containers used to manage hazardous waste at TSDFs, as well as at generators using tanks and containers to accumulate large quantities of waste on site. The document is divided into a three volume set.

Keywords: *Air pollution standards, *Environmental impact statements-Draft, *Hazardous materials, *Waste management, Air pollution control, Air pollution abatement, Air pollution monitoring, Waste treatment, Waste disposal, Waste storage, Continuous sampling, Air pollution control equipment, Cost estimates, Economic impacts, Exposure, Mathematical models, Public health, Energy sources, Tanks(Containers), Containers, *Resource Conservation and Recovery Act.

PB91-233601/REB PC **A05**/MF **A01**
Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

Maumee River Basin Pilot Watershed Study. Volume 4. Continued Watershed Monitoring (1981-1985) and Rainulator Study (1986).
Ohio State Univ., Columbus.
T. J. Logan, and R. Rettig. 1991, 90p EPA/905/9-91/008A , , GL-09A/91
Grant EPA-R-005774
See also PB85-120160. Prepared in cooperation with Defiance Soil and Water Conservation District, OH. Sponsored by Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

The Maumee River was chosen by PLUARG (Pollution From Land Use Activities Reference Group) to be one of four pilot watersheds to be studied on the U.S. side of the Great Lakes drainage basin as part of Task C--pilot watershed studies. The objectives of PLUARG were to determine the effects of prevailing land use practices on pollution entering the Great Lakes. The Maumee River Basin is primarily agricultural in land use, and the intensive crop production in the Basin accounts for most of the sediment and a major part of the nitrogen and phosphorus delivered to Lake Erie (Corps of Engineers, 1975; Sonzogni et al, 1978). Because of the importance of agriculture as a source of pollutants in the Maumee Basin, it was decided to place emphasis in the Task C project on soil and nutrient loss from small agricultural watersheds and on specialized studies on sediment transport.

Keywords: *Water pollution control, *Agricultural watersheds, *Maumee River Basin, *Agricultural runoff, *Rainfall-runoff relationships, Great Lakes, Land use, Sediment transport, Nitrogen, Phosphorus, Crop production, Soil erosion, Precipitation(Meteorology), Rainfall, Suspended sediments, Pollution From Land Use Activities Reference Group.

PB91-233627/REB PC **A99**/MF **A06**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Remedial Action, Treatment, and Disposal of Hazardous Waste. Proceedings of the Annual Hazardous Waste Research Symposium (17th). Held in Cincinnati, Ohio on April 9-11, 1991.
JACA Corp., Fort Washington, PA.
Apr 91, 708p
Contracts EPA-68-C8-0062, EPA-68-C8-0036
See also PB91-148379. Prepared in cooperation with Science Applications International Corp., Cincinnati, OH. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The Seventeenth Annual RREL Research Symposium on Remedial Action, Treatment and Disposal of Hazardous Waste was held in Cincinnati, Ohio, April 9-11, 1991. The purpose of the Symposium was to present the latest significant research findings from ongoing and recently completed projects funded by the Risk Reduction Engineering Laboratory (RREL). These Proceedings are organized in three sections: Sessions A and B consist of paper presentations. Session C contains the poster abstracts. Subjects include remedial action treatment and control technologies for waste disposal, landfill liner and cover systems, underground storage tanks, and demonstration and development of innovative/alternative treatment technologies for hazardous waste. Alternative technology subjects include thermal destruction of hazardous wastes, field evaluations, existing treatment options, emerging treatment processes, waste minimization, and biosystems for hazardous waste destruction.

Keywords: *Hazardous materials, *Waste treatment, *Waste disposal, *Remedial action, *Meetings, *Research and development, Pollution control, Substitutes, Incineration, Biotechnology, Earth fills, Pollution abatement, Soil treatment, Superfund, Biodeterioration, Linings, Underground storage, Storage tanks, Field tests, Capping, Waste minimization, Landfill covers.

PB91-233635/REB PC **A12**/MF **A03**
Health and Environmental Effects Document for Boron and Boron Compounds.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Jan 91, 269p EPA/600/8-91/015

Health and Environmental Effects Documents (HEEDS) are prepared for the Office of Solid Waste and Emergency Response (OSWER). The document series is intended to support listings under the Resource Conservation and Recovery Act (RCRA) as well as to provide health-related limits and goals for emergency and remedial actions under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Both published literature and information obtained from Agency Program Office files are evaluated as they pertain to potential human health, aquatic life and environmental effects of hazardous waste constituents. Several quantitative estimates are presented provided sufficient data are available. For systemic toxicants, these include Reference Doses (RfDs) for chronic and subchronic exposures for both the inhalation and oral exposures. In the case of suspected carcinogens, RfDs may not be estimated. Instead, a carcinogenic potency factor, or q(sub 1)*, is provided. These potency estimates are derived for both oral and inhalation exposures where possible. In addition, unit risk estimates for air and drinking water are presented based on inhalation and oral data, respectively. Reportable quantities (RQs) based on both chronic toxicity and carcinogenicity are derived. The RQ is used to determine the quantity of a hazardous substance for which notification is required in the event of a release as specified under CERCLA.

Keywords: *Environmental effects, *Environmental health, *Hazardous materials, *Waste management, *Boron, Dosage, Remedial action, Emergency planning, Aquatic life, Inhalation, Air pollution, Ecosystems, Land pollution, Oral intake, Boron compounds, Water pollution, Toxicity, Risk assessment, Carcinogens, Potable water, Exposure, Public health, Office of Solid Waste and Emergency Response, Resource Conservation and Recovery Act.

PB91-233643/REB PC **A99**/MF **E11**
Preliminary Evaluations of Initial TSCA Section 8(e) Substantial Risk Notices. January 1, 1989 to September 30, 1990.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Jul 91, 966p EPA/560/2-91/001
See also PB89-182687.

The volume contains, in ascending submission number order, 'status reports' (i.e., preliminary evaluations) prepared by the staff of the Office of Toxic Substances in EPA's Office of Pesticides and Toxic Substances for initial submissions received by EPA from chemical manufacturers, importers, processors and distributors from January 1, 1989 to September 30, 1990 under Section 8(e) the 'substantial risk' information reporting provision of the Toxic Substances Control Act (TSCA). The status reports contained in this compendium reflect only the initial phase of the Agency's evaluation process for the submitted information. The TSCA Section 8(e) status report volume has been published by EPA for two reasons. First, a volume of Section 8(e) status reports with appropriate indices will make the submitted information more accessible. Second, the volume may, by providing specific examples of submitted information and EPA's preliminary evaluation of that information, help those persons who are subject to Section 8(e) understand better the types of information that should be submitted to EPA under this mandatory reporting provision of TSCA.

Keywords: *Toxic substances, *Risk, *Chemical industry, *Chemical compounds, Environmental surveys, Public health, Hazards, Evaluation, Toxicity, *Toxic Substances Control Act.

PB91-233650/REB PC **A19**/MF **A04**
Environmental Compliance Branch, Standard Operating Procedures and Quality Assurance Manual, Revision 1.
Environmental Protection Agency, Athens, GA. Environmental Services Div.
1 Feb 91, 449p*

The document contains the field procedures developed by US-EPA, Region IV, ESD for investigating hazardous waste sites for the RCRA and Superfund programs, performance of NPDES inspection and air monitoring. In particular, sampling of environmental media and waste, sample handling and preservation, decontamination of field equipment, installation of monitoring wells, and field quality assurance procedures are described. Sampling equipment is discussed and described. Surveying requirements for site characterization are given.

Keywords: *Hazardous materials, *Site surveys, *Waste management, Air pollution standards, Water pollution standards, Environmental surveys, Field tests, Administrative procedures, Operations, Quality assurance, Standards compliance, Soil analysis, Environmental monitoring, Decontamination, Observation wells, Inspections, Procedures, Superfund, Performance standards, Sampling, Resource Conservation and Recovery Act, *EPA region 4.

PB91-233858/REB PC **A03**/MF **A01**
Recommended Operating Procedure No. 2.3: Sampling and Analysis of Total Hydrocarbons from Sources by Continuous Emission Monitor. Final rept. Jul 90-Jan 91.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
R. A. Grote, J. V. Ryan, S. J. Wasson, R. S. Wright, and A. E. Worth. Aug 91, 25p EPA/600/8-91/051
Prepared in cooperation with Acurex Corp., Research Triangle Park, NC., and Research Triangle Inst., Research Triangle Park, NC.

The report is a recommended operating procedure (ROP), prepared for use in research activities conducted by EPA's Air and Energy Engineering Research Laboratory (AEERL). The described method is applicable to the continuous measurement of total hydrocarbons (THCs), also known as total gaseous organic concentration (TGOC), in effluent gases where THC concentrations are in the range 0 to 2000 parts per million (ppm). ROPs describe non-routine or experimental research operations where some judgment in application may be warranted. ROPs may not be applicable to activities conducted by other research groups, and should not be used in place of standard operating procedures such as those published in the Federal Register. Use of ROPs must be accompanied by an understanding of their purpose and scope. Questions should be directed to AEERL.

Keywords: *Effluents, *Hydrocarbons, *Monitors, Chemical analysis, Measuring instruments, Air pollution, Air pollution control, Stationary sources, *Recommended operating procedure, *Continuous emission monitors, *Flame ionization detectors.

PB91-234278/REB PC **A05**/MF **A01**
Cacodylic Acid: Decision Document.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Dec 81, 82p EPA/540/09-91/141
See also PB91-216473.

The document reports the results of the Agency's review of currently available evidence on cacodylic acid, specifically regarding teratogenicity/fetotoxicity, mutagenicity, oncogenicity, and effects on wildlife as toxicological areas of concern. The document contains six parts. Part I is an introduction. Part II presents general information about cacodylic acid. Part III evaluates available data on exposure and mammalian metabolism. Part IV discusses the hazard evidence for considering cacodylic acid as a candidate for the rebuttable presumption against registration (RPAR) process. The conclusions and recommendations given in Section V are based on considerations of exposure as well as toxicological evidence. Part VI is a bibliographical listing of sources cited.

Keywords: *Cacodylic acid, *Pesticides, Health hazards, Plants(Botany), Water pollutants, Environmental exposure pathway, Citrus trees, Deoxyribonucleic acids, Teratogenic compounds, Mutagens, Carcinogens, Mutations, Wildlife, *Decision document.

PB91-234427/REB PC **A99**/MF **A06**
Development Document for Final Effluent Limitations Guidelines and New Source Performance Standards for the Ore Mining and Dressing. Point Source Category. Final rept.
Environmental Protection Agency, Washington, DC. Effluent Guidelines Div.
B. M. Jarrett. Nov 82, 673p EPA/440/1-82/061
See also PB82-250952.

The document presents a study to determine the presence and concentrations of the 129 priority pollutants in the ore mining and dressing point source category and the technical data base compiled by EPA with regard to these pollutants and their treatability for regulation under the Clean Water Act. The concentrations of conventional and nonconventional pollutants were also examined for the establishment of effluent limitations guidelines. Treatment technologies were as-

sessed for designation as the best available demonstrated technology (BADT) upon which new source performance standards (NSPS) are based. The document outlines the technology options considered and the rationale for selecting each technology level. These technology levels are the basis for the regulation promulgated December 3, 1982 (47 FR 54598).

Keywords: *Water pollution control, *Mineral deposits, Water treatment, Guidelines, Performance evaluation, Standards, Regulations, Sewage treatment, Copper, Milling, Recovery, Byproducts, Solvent extraction, Industrial wastes, Tables(Data), Iron, Benefication, Separation, Gravity, Clean Water Act, Best Available Demonstrated Technology.

PB91-234435/REB PC **E99**/MF **E99**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Proceedings: The 1990 International Symposium on Radon and Radon Reduction Technology. Held in Atlanta, Georgia on February 19-23, 1990.
Radian Corp., Research Triangle Park, NC. Progress Center.
Jul 91, 1374p-in 3v
Set includes PB91-234443 through PB91-234468. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

No abstract available.

PB91-234443/REB PC **A17**/MF **A04**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Proceedings: The 1990 International Symposium on Radon and Radon Reduction Technology. Held in Atlanta, Georgia on February 19-23, 1990. Volume 1. Symposium Oral Papers (Sessions 1-4).
Radian Corp., Research Triangle Park, NC. Progress Center.
Jul 91, 394p EPA/600/9-91/026A
Contract EPA-68-02-4286
See also Volume 2, PB91-234450. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Also available in set of 3 reports PC E99/MF E99, PB91-234435.

The 1990 International Symposium on Radon and Radon Reduction Technology was held on February 19-23, 1990, in Atlanta, Georgia. Sponsored jointly by the U. S. Environmental Protection Agency's Air and Energy Engineering Research Laboratory (EPA-AEEERL) and Office of Radiation Programs (EPA-ORP), the symposium was devoted to the exchange of current research developments on radon and radon reduction technology in the indoor environment. Education in radon research and the dissemination of technical information were the primary objectives of the meeting. Forty-seven oral papers, 13 panel presentations, and 45 poster papers were presented, with the keynote address focusing on the 'big picture' regarding radon risks and its reduction. The papers addressed a variety of radon topics: government programs, policies, and public information; health studies; radon measurement methods; radon surveys; entry dynamics; radon in the natural environment; radon reduction methods; radon prevention in new construction; and radon in schools and large buildings.

Keywords: *Meetings, *Radon, *Air pollution control, *Indoor air pollution, *Information dissemination, *Environmental surveys, Natural radioactivity, Air pollution abatement, Technology utilization, Public information, Public health, Research and development, Risk assessment, Environmental policy, Radiation monitoring, School buildings, Buildings.

PB91-234450/REB PC **A19**/MF **A04**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Proceedings: The 1990 International Symposium on Radon and Radon Reduction Technology. Held in Atlanta, Georgia on February 19-23, 1990. Volume 2. Symposium Oral Papers (Sessions 5-9).
Radian Corp., Research Triangle Park, NC. Progress Center.
Jul 91, 429p EPA/600/9-91/026B
Contract EPA-68-02-4286
See also Volume 1, PB91-234443 and Volume 3, PB91-234468. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Also available in set of 3 reports PC E99/MF E99, PB91-234435.

The proceedings document presentations at a symposium, jointly sponsored by the U.S. EPA's Air and Energy Engineering Research Laboratory (EPA-AEERL) and Office of Radiation Programs (EPA-ORP), held in Atlanta, GA, on February 19-23, 1990. The symposium provided a forum for the exchange of technical information on radon and radon reduction technology in the indoor environment. The meeting was intended to both educate and inform. Oral papers, along with panel and poster presentations, on recent research in radon and radon reduction methods provided for interesting exchanges in such areas as: government activities in radon, radon health studies, radon measurement methods, radon surveys, radon entry dynamics, radon in the natural environment, radon reduction methods, radon prevention in new construction, and radon in schools and other large buildings. The three-volume proceedings contain 47 oral papers, 13 panel papers (Volume 1 and 2), and 45 poster papers (Volume 3).

Keywords: *Meetings, *Radon, *Air pollution control, *Indoor air pollution, *Information dissemination, *Environmental surveys, Dynamics, Buildings, Mathematical models, Natural radioactivity, Research and development, Air pollution abatement, Radioactivity transport, School buildings, Environmental engineering, Radiation monitoring, Soil gases, Subslab depressurization systems.

PB91-234468/REB PC **A24**/MF **A04**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Proceedings: The 1990 International Symposium on Radon and Radon Reduction Technology. Held in Atlanta, Georgia on February 19-23, 1990. Volume 3. Symposium Poster Papers.
Radian Corp., Research Triangle Park, NC. Progress Center.
Jul 91, 551p EPA/600/9-91/026C
Contract EPA-68-02-4286
See also Volume 2, PB91-234450. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Also available in set of 3 reports PC E99/MF E99, PB91-234435.

The proceedings document presentations at a symposium, jointly sponsored by the U.S. EPA's Air and Energy Engineering Research Laboratory (EPA-AEERL) and Office of Radiation Programs (EPA-ORP), held in Atlanta, GA, on February 19-23, 1990. The symposium provided a forum for the exchange of technical information on radon and radon reduction technology in the indoor environment. The meeting was intended to both educate and inform. Oral papers, along with panel and poster presentations, on recent research in radon and radon reduction methods provided for interesting exchanges in such areas as: government activities in radon, radon health studies, radon measurement methods, radon surveys, radon entry dynamics, radon in the natural environment, radon reduction methods, radon prevention in new construction, and radon in schools and other large buildings. This volume has 45 poster papers and the lead talk was on 'Reducing the Health Risks of Radon to the Public'.

Keywords: *Meetings, *Radon, *Air pollution control, *Indoor air pollution, *Information dissemination, *Environmental surveys, Air pollution abatement, Technology utilization, Public information, Public health, Research and development, Natural radioactivity, Risk assessment, Environmental policy, Radiation monitoring, School buildings, Buildings.

PB91-234476/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Heating, Ventilating, and Air Conditioning Equipment. Environmental research brief.
University City Science Center, Philadelphia, PA.
F. W. Kirsch, and G. P. Looby. Jul 91, 6p EPA/600/M-91/019
Grant EPA-R-814903
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at the University of Tennessee inspected a plant manufacturing heating, ventilating, and air conditioning equipment. Of the distinct process lines in the plant, three generated hazardous waste: the manufacture of fan coil units and air terminal units and the painting process. The manufacture of fan coil units generated the most and the greatest variety of these wastes. The team's report, detailing findings and recommendations, suggested that to reduce adhesive overspray, defectively glued insulation board, and adhesive carrier vapor, the plant should consider using nonferric screws instead of adhesives to attach insulation to sheet metal parts, or replace solvent-based adhesives (wholly or in part) with water-based adhesives. The amount of waste would be the same, but it would be nonhazardous and could be disposed of in municipal waste.

Keywords: *Hazardous materials, *Waste management, *Environmental engineering, *Pollution abatement, Industrial wastes, Assessments, Research and development, Painting, Air conditioning equipment, Ventilation fans, Heating equipment, Adhesives, *Waste minimization, Source reduction, SIC 20-39.

PB91-234484/REB PC **A01**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Brazed Aluminum Oil Coolers. Environmental research brief.
University City Science Center, Philadelphia, PA.
F. W. Kirsch, and G. P. Looby. Jul 91, 4p EPA/600/M-91/018
Grant EPA-R-814903
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack the expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at the University of Tennessee inspected a plant manufacturing brazed aluminum oil coolers that are used in heavy equipment. After the cooler components are fabricated, they are degreased (with Chlorothene, which is recycled); assembled; brazed to join internal and external coil fin surfaces (involving a molten salt bath and a quench tank whose sludge is disposed of on-site in a sand filter bed); cleaned (with solutions and rinse waters needing treatment and disposal); and painted. The team's report, detailing findings and recommendations, indicated that a significant minimization opportunity could be effected by replacing molten salt bath brazing with vacuum brazing. The implementation cost would be high and the payback years relatively long, but the percent waste reduction (80%) and annual savings would be pronounced. The Research Brief was developed by the principal investigators and EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key findings of an ongoing research project that is fully documented in a separate report of the same title available from the authors.

Keywords: *Hazardous materials, *Waste management, *Pollution abatement, *Oil coolers, Research and development, Industrial wastes, Assessments, Degreasing, Water pollution control, Brazing, Waste disposal, Waste recycling, Heavy duty vehicles, Implementation, Waste treatment, Cleaning, *Waste minimization, Source reduction, SIC 20-39.

PB91-234492/REB PC **A01**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Metal Parts Coating Plant. Environmental research brief.
University City Science Center, Philadelphia, PA.
F. W. Kirsch, and G. P. Looby. Jul 91, 5p EPA/600/M-91/015

Grant EPA-R-814903
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack the expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at the University of Tennessee performed an assessment at a plant where automotive parts are coated with epoxy, vinyl, or polyester powders; with liquid plastisol; or with paint. After the WMAC team analyzed five process lines (for applying coatings) and the reworking operation (where unacceptably finished parts are stripped), a report was prepared detailing their findings and recommendations. They found three ways to reduce the evaporation of methylethyl ketone (MEK), the largest source of waste on the process lines: reduce the open surface area of the MEK container, cool the MEK, or meter the MEK. They also found ways to reduce wastes from the rework process by installing controls, repairing defective drive components, or using alternative methods to remove defective coatings. The Research Brief was developed by the principal investigators and EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key findings of an ongoing research project that is fully documented in a separate report of the same title available from the authors.

Keywords: *Hazardous materials, *Waste management, *Pollution abatement, *Coating processes, Automotive industry, Painting, Plastics, Water pollution control, Fugitive emissions, Assessments, Industrial wastes, Epoxy resins, Vinyl coatings, Polyester resins, *Waste minimization, *Automotive parts, Ketone/methylethyl, Source reduction, SIC 20-39.

PB91-234500/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Outdoor Illuminated Signs. Environmental research brief.
University City Science Center, Philadelphia, PA.
F. W. Kirsch, and G. P. Looby. Jul 91, 7p EPA/600/M-91/016
Grant EPA-R-814903
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack the expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at the University of Tennessee inspected a plant making large and small outdoor signs with the use of steel channels and sheeting, plastic sheeting, paint, adhesives, electrical wiring, and hardware. The team's report, detailing their findings and recommendations, identified the greatest opportunities to minimize waste in the painting, cleaning, and letter gluing operations. The greatest savings would result from the reactivation of an unused electrostatic paint spray system. The Research Brief was developed by the principal investigators and EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key findings of an ongoing research project that is fully documented in a separate report of the same title available from the authors.

Keywords: *Hazardous materials, *Waste management, *Pollution abatement, *Lighting equipment, Assessments, Industrial wastes, Illuminators, Painting, Cleaning, *Waste minimization, *Signs, Source reduction, SIC 20-39.

PB91-234518/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Rebuilt Railway Cars and Components. Environmental research brief.
University City Science Center, Philadelphia, PA.
F. W. Kirsch, and G. P. Looby. Jul 91, 6p EPA/600/M-91/017
Grant EPA-R-814903
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack the expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at the University of Tennessee inspected a plant that rebuilds approximately 2,000 railway cars (open, flat, and freight) each year and that refurbishes wheel assemblies and air brake systems. The team's report, detailing their findings and recommendations, indicated that the greatest opportunities to minimize waste came from the railcar painting operation where paint and primer solids and sludge are generated. The team recommended installing an electrostatic spray paint system for priming and painting to reduce the overspray losses. The Research Brief was developed by the principal investigators and EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key findings of an ongoing research project that is fully documented in a separate report of the same title available from the authors.

Keywords: *Hazardous materials, *Waste management, *Pollution abatement, *Railroad cars, Assessments, Industrial wastes, Painting, Sludge disposal, Solvents, Research and development, Waste disposal, *Waste minimization, Source reduction, SIC 20-39.

PB91-234526/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Bumper Refinishing Plant. Environmental research brief.
University City Science Center, Philadelphia, PA.
F. W. Kirsch, and G. P. Looby. Jul 91, 6p EPA/600/M-91/020
Grant EPA-R-814903
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack the expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at Colorado State University inspected a plant refinishing steel, aluminum, and plastic bumpers. The plant is new and already incorporates many hazardous waste management features. After the bumpers are straightened, the processes to remove old plating and coating, the rinsing, the caustic cleaning for steel bumpers and desmuting for aluminum ones, followed by more rinsing generates significant quantities of waste. Aluminum bumpers are then reanodized at another location; the steel bumpers are soaked in cleaning solutions and rinsed (and soaked and rinsed), creating still more waste, before being electrolytically replated with nickel and chromium. The team's report, detailing findings and recommendations, indicated that the greatest waste reduction could occur with the use of additional filtration along with the existing deionization systems. Their use would reduce chromium and nickel levels in rinse waters and other liquid streams to levels acceptable for recycle to the plant. The collected solids would go to a landfill for disposal. Because steel and aluminum bumpers generate the most waste, plastic bumpers were not considered for the purpose of the assessment. The Research Brief was developed by the principal investigators and EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key findings of an ongoing research project that is fully documented in a separate report of the same title available from the authors.

Keywords: *Hazardous materials, *Pollution abatement, *Waste management, *Bumpers, Industrial wastes, Assessments, Waste disposal, Cleaning, Waste recycling, Electroplating, Research and development, Stripping, Aluminum, Plastics, Steels, *Waste minimization, SIC 20-39, Source reduction.

PB91-234534/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for Multilayered Printed Circuit Board Manufacturing. Environmental research brief.
University City Science Center, Philadelphia, PA.
F. W. Kirsch, and G. P. Looby. Jul 91, 8p EPA/600/M-91/021
Grant EPA-R-814903
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack the expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at Colorado State University inspected a plant manufacturing multilayered circuit boards. This complex operation has seven key elements: preparing individual layers of boards; transferring circuit patterns to these layers and forming copper oxide castings; bonding to form multiple layers; applying copper (electroless plating) to ensure electrical contact; applying photoresist to define the area on which copper circuits are to be plated; applying copper electrolytically to establish circuit patterns on outer board surfaces followed by tin or tin/lead plating to protect the circuits; and applying solder and final cleanup after selectively removing protective tin layers. All these elements of the manufacturing process generate hazardous waste, e.g., electrolytic application of copper generates sulfuric acid; propylene glycol methyl ether; copper-laden deionized water and rinse water; ethoxylated octylphenol; copper-free drag-out-laden water; and copper sulfate. The plant had already instituted waste minimization techniques; the team's report, detailing findings and recommendations, indicated that additional reductions and savings, although not as great, were still possible. The greatest reduction would come from separating liquid wastes into four streams containing differing amounts of waste. Copper-containing streams could be further treated and reused in process rinses and baths. Spent process solutions could be stored for recycling and reclaiming. The Research Brief was developed by the principal investigators and EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key findings of an ongoing research project that is fully documented in a separate report of the same title available from the authors.

Keywords: *Hazardous materials, *Waste management, *Pollution abatement, *Circuit boards, Laminates, Industrial wastes, Assessments, Liquid wastes, Cleaning, Waste recycling, Sulfuric acid, Soldering alloys, *Waste minimization, Electroless plating, Source reduction, SIC 20-39.

PB91-234542/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Printed Circuit Boards. Environmental research brief.
University City Science Center, Philadelphia, PA.
F. W. Kirsch, and G. P. Looby. Jul 91, 8p EPA/600/M-91/022
Grant EPA-R-814903
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack the expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at Colorado State University inspected a plant producing printed circuit boards – a plant that already had taken steps to control its hazardous wastes. Producing a circuit board involves many major processes and subprocesses: preparing the board; depositing copper on the board by electroless plating; applying dry film; electrolytically plating copper; electrolytically plating tin; etching and stripping; applying solder; and, perhaps, plating gold on connectors. Each of these steps produces hazard-

ous wastes, e.g., electrolytic copper plating results in acid soap dumps, copper and tin drag-out, and sulfuric acid. The main sources of metallic contamination (copper (both dissolved and metallic), tin, lead, gold) are the rinses after scrubbing, plating, and etching. Although the greatest amount of waste can be reduced by reusing effluent from the MEMTEK (with some further treatment), the greatest dollar savings can be found by changing the dry film developer. The present brand adheres strongly to the unexposed film and requires an aggressive acid soap; a less aggressive, nonhazardous soap could be used with a less-adhering dry film developer. The Research Brief was developed by the principal investigators and EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key findings of an ongoing research project that is fully documented in a separate report of the same title available from the authors.

Keywords: *Hazardous materials, *Waste management, *Pollution abatement, *Circuit boards, Assessments, Industrial wastes, Electroplating, Sulfuric acid, Liquid wastes, Metals, Cleaning, Soldering alloys, *Waste minimization, Electroless plating, Source reduction, SIC 20-39.

PB91-234559/REB PC **A01**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Paint Manufacturing Plant. Environmental research brief.
University City Science Center, Philadelphia, PA.
F. W. Kirsch, and G. P. Looby. Jul 91, 5p EPA/600/M-91/023
Grant EPA-R-814903
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack the expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at Colorado State University inspected a plant blending and mixing raw materials into paints, coatings, stains, and surface-treating products. For water-based paints, water, latex, resins, extenders, and pigments are mixed and blended. For oil-based paints, solvents replace water and latex, and plasticizers, tints, and thinners are also added. These batches are then transferred to let-down tanks where additional ingredients are incorporated. After testing, the paints meeting specifications are filtered, canned, labelled, and packaged for shipping. Hazardous wastes result when the mixing vessels, let-down tanks, and lines are cleaned. For example, cleaning a let-down tank after a water-based paint has been blended requires about 35 gal water; after a 400-gal tank for a solvent-based paint, about 5 gal mineral spirits. Because the spirits are sent off-site for recovery, most of the waste results from cleaning up after mixing water-based paint. This waste is hazardous because it contains mercury used as the bactericide. Although the plant reuses rinse water, recovers solvent, and has adopted other measures to reduce waste, the team report, detailing findings and recommendations, suggested that additional savings could result from installing a pipe cleaning system, using a solvent-recovery system based on distillation, and substituting an organic material for the mercury bactericide. The Research Brief was developed by the principal investigators and EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key findings of an ongoing research project that is fully documented in a separate report of the same title available from the authors.

Keywords: *Hazardous materials, *Waste management, *Pollution abatement, *Paints, *Coatings, Industrial wastes, Assessments, Materials recovery, Solvents, Cleaning, Waste utilization, Bactericides, Environmental chemical substitutes, Mercury(Metal), *Waste minimization, Source reduction, SIC 20-39.

PB91-234567/REB PC **A01**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Compressed Air Equipment Components. Environmental research brief.
University City Science Center, Philadelphia, PA.
F. W. Kirsch, and G. P. Looby. Jul 91, 5p EPA/600/M-91/024
Grant EPA-R-814903
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack the expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at Colorado State University inspected a plant manufacturing zinc and aluminum alloy filters, regulators, lubricators, fittings, and valves -- components for compressed air equipment. Each step of the manufacturing process creates waste: fabricating zinc and aluminum diecast parts generates scrap metal and spent lubricants and hydraulic fluid; milling, drilling, and tapping generate spent cutting/cooling fluid and solvents and metal shavings; cleaning machined parts and steel parts fashioned off-site generates waste oil and 1,1,1,-trichloroethane; and surface coating of metal parts generates effluents from chemical baths and alkaline rinses, e.g., chromium, sulfate, and phosphate precipitates. Other processes generate additional waste hydraulic fluid, cutting/cooling fluid, and Freon. Although the plant had already changed several procedures to minimize its wastes, the WMAC team's report, detailing findings and recommendations, identified several practices that might be changed to effect greater waste reduction and savings. The recommendation resulting in the greatest reduction involves replacing chromium-containing reagents with those that generate no hazardous waste; the proposed coating process requires no rinsing and would, therefore, not contaminate rinse waters. The Research Brief was developed by the principal investigators and EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key findings of an ongoing research project that is fully documented in a separate report of the same title available from the authors.

Keywords: *Hazardous materials, *Waste management, *Pollution abatement, *Pneumatic equipment, *Compressed air, Assessments, Industrial wastes, Cleaning, Lubricants, Coolants, Solvents, Metals, Waste disposal, Waste treatment, *Waste minization, Source reduction, SIC 20-39.

PB91-234575/REB PC **A01**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Aluminum Cans. Environmental research brief.
University City Science Center, Philadelphia, PA.
F. W. Kirsch, and G. P. Looby. Jul 91, 5p EPA/600/M-91/025
Grant EPA-R-814903
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) has funded a pilot project to assist small- and medium-size manufacturers who want to minimize their generation of hazardous waste but who lack the expertise to do so. Waste Minimization Assessment Centers (WMACs) were established at selected universities and procedures were adapted from the EPA Waste Minimization Opportunity Assessment Manual (EPA/625/7-88/003, July 1988). The WMAC team at Colorado State University inspected a plant producing more than one billion aluminum cans each year for a local beverage producer. After the cans have been formed, they are cleaned and painted. These two operations generate the waste: most can cleaning wastes are treated and sewered, and the hazardous painting and inking operations' wastes are shipped to a hazardous waste disposal facility. The on-site treatment facility treats the can washing effluent so that the oil can be hauled to an oil recycler, the sludge disposed of off-site, and the clarified liquid discharged to the sewer. Because the plant had already initiated many steps to minimize and manage its wastes, the WMAC's team report, detailing their findings and recommendations, was only able to suggest that a nonhazardous reagent be substituted for the presently used reagent that contains from 2% to 4% ammonium fluozirconate. The can washing sludge would then be nonhazardous, and all of the hazardous waste disposal costs could be saved. The Research Brief was developed by the principal investigators and EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key findings of an ongoing research project that is fully documented in a separate report of the same title available from the authors.

Keywords: *Hazardous materials, *Waste management, *Pollution abatement, *Cans, Beverages, Assessments, Industrial wastes, Research and development, Waste disposal, Waste recycling, Food processing, Water pollution control, Aluminum, Cleaning, Painting, Sludge disposal, Activated carbon treatment, *Waste minimization, SIC 20-39, Source reduction.

PB91-234583/REB PC **A05**/MF **A02**
Office of Air Quality Planning and Standards (OAQPS) Technology Transfer Network (TTN). User's Manual.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
H. W. Rorex. Aug 91, 98p EPA/450/4-91/020

The Office of Air Quality Planning and Standards (OAQPS) Technology Transfer Network (TTN) is a network of electronic bulletin boards that provide information and technology exchange in areas related to air pollution control such as, air quality modeling, emissions testing, control technology, emissions inventories and factors, training and the Clean Air Act Amendments. The manual describes the functions of the system and provides instructions for operating the system.

Keywords: *Air pollution control, *Air quality, *Information systems, Computer networks, Emission factors, Technology transfer, Air pollution abatement, Clean Air Act Amendments of 1970, Protocols, File management systems, Electronic mail, On line systems, Manuals, Electronic bulletin board systems.

PB91-234591/REB PC **A02**/MF **A01**
Test Methods for 'Escherichia coli' in Drinking Water: EC Medium with Mug Tube Procedure. Nutrient Agar with Mug Membrane Filter Procedure.
Environmental Monitoring Systems Lab., Cincinnati, OH.
R. H. Bordner. Jul 91, 9p EPA/600/4-91/016

Two analytical methods for measuring the bacteriological quality of drinking water are described. They are approved for determining compliance of public water systems with the National Primary Drinking Water Regulations. The presence of Escherichia coli in drinking water is an indication of fecal pollution and the possible presence of enteric pathogens.

Keywords: *Water microbiology, *Potable water, *Escherichia coli, Chemical water pollutants, Tests, Quality control, Membranes, Culture media.

PB91-234609/REB PC **A06**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Drinking Water Research Div.
Removal of DBCP from Groundwater. Volume 2. Field Pilot Plant Operation. Final rept.
California State Univ., Fresno.
K. E. Longley, G. P. Hanna, and B. H. Gump. Sep 91, 106p EPA/600/2-91/047
See also PB89-198808. Sponsored by Environmental Protection Agency, Cincinnati, OH. Drinking Water Research Div.

Static bottle-point and dynamic Freundlich adsorption isotherm determinations were performed on groundwaters containing different pesticide contaminants: 1, 2- dibromo-3-chloropropane (DBCP), ethylenedibromide (EDB), and 1, 2- dichloropropane (DCP). Field tests were carried out under ambient environmental conditions with natural variabilities in water quality which can affect pilot plant performance. These water quality variabilities included a large variance in temperature during the lengthy period of field operations. Both static and dynamic isotherm data, the latter determined from two systems of different scale, were shown to be indicative of carbon use data for GAC at exhaustion. The finding is significant since static isotherm data are easier and less costly to develop. Carbon use determinations were made for both DBCP and EDB. No decrease in DBCP or change in carbon use could be attributed to bacteria enumerated by the heterotrophic plate counts. However, bacterial metabolic products could be a source of material adsorbing onto the GAC.

Keywords: *Activated carbon treatment, *Water treatment, *Ground water, *Bromohydrocarbons, *Chloropropanes, Adsorption, Isotherms, Pesticides, Water pollution, Field tests, Performance evaluation.

PB91-234617/REB PC **A05/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Evaluation of the Middas System for Development of Design Data for GAC Adsorbers. Final rept.
Michigan Univ., Ann Arbor.
W. J. Weber, M. C. Carter, K. P. Olmstead, and L. E. Katz. Sep 91, 93p EPA/600/2-91/048
Grant EPA-R-814135-01-0
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The Micro-Diameter-Depth Adsorption System (MIDDAS) was evaluated for its usefulness in determining equilibrium parameters for adsorption in granular activated carbon (GAC) systems. The system employs a column configuration for determining such parameters, rather than the traditional completely mixed batch reaction (CMBR) configuration. The equilibrium results were employed in the Homogeneous Surface Diffusion Model (HSDM) in conjunction with the Short Bed Adsorber (SBA) technique to determine rate parameters for trichloroethylene (TCE) adsorption in GAC in both single-solute and more complex systems. These calibrated rate parameters were used in subsequent verification studies with deep adsorption beds; the results indicated that rate parameters determined using the MIDDAS technique tended to provide better predictions of deep bed behavior compared to those determined with the CMBR methodology.

Keywords: *Activated carbon treatment, *Water treatment, *Potable water, Adsorption, Isotherms, Performance evaluation, Transport properties, Water pollution, Hazardous materials, Chlorobenzenes, Chlorohydrocarbons, *Micro Diameter Depth Adsorption System.

PB91-234625/REB PC **A06/MF A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Separation of Hazardous Organics by Low Pressure Reverse Osmosis Membranes. Phase 2 Final Report.
Kentucky Univ., Lexington. Dept. of Chemical Engineering.
D. Bhattacharyya, and M. E. Williams. Sep 91, 111p EPA/600/2-91/045
See also PB87-214870. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Extensive experimental studies showed that thin-film, composite membranes can be used effectively for the separation of selected hazardous organic compounds. This waste treatment technique offers definite advantages in terms of high solute separations at low pressures (<2MPa) and broad pH operating range, and the use of charged membranes would allow the selective separation of some organics from feeds containing high salt concentrations. In addition, feed preozonation of selected organics provided significant improvement in flux and rejection characteristics for both charged and uncharged membranes because of the formation of ionizable organic acid intermediates during the ozonation that did not interact as strongly with the membrane. The overall ozonation/membrane process effectively produced permeate water of high quality while it minimized the volume of waste that must be further treated.

Keywords: *Osmosis, *Water pollution control, *Membranes, *Organic compounds, Ozonation, Separation, Hazardous materials, Technology assessments, *Reverse osmosis, *Low pressure membranes, *Charged membranes.

PB91-234633/REB PC **A05/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Bench-Scale Evaluation of Ammonia Removal from Wastewater by Steam Stripping. Final rept.
Battelle, Columbus, OH.
G. B. Wickramanayake, D. Evers, J. A. Kittel, and A. Gavaskar. Sep 91, 82p EPA/600/2-91/046
Contract EPA-68-03-3248
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The purpose of the study was to generate laboratory data to support the development of wastewater discharge standards for ammonia in nonferrous metal winning processes. The objective was accomplished by studying ammonia removal from synthetically compounded 'wastewater' samples using a bench-scale steam stripping apparatus. Although no significant variation of mass transfer rate coefficient (K) was observed when SO4(-2) concentrations were varied from 5,000 to 20,000 mg/L, K was the highest for low SO4(-2) wastewaters when pH was adjusted using NaOH. Results of the steam stripping study indicated that varying chemical constituents such as SO4(-2) and the molal strength did not have a significant effect on the efficiency of ammonia removal.

Keywords: *Waste water, *Water treatment, *Industrial wastes, *Ammonia, *Stripping, *Bench-scale experiments, Technology assessment, Cost analysis, pH, Calcium oxides, Sulfates, Metal industry, *Steam stripping.

PB91-235499/REB PC **A05/MF A01**
Environmental Protection Agency, Washington, DC.
Fiscal Year 1990 Summary Report of NOAA Atmospheric Sciences Modeling Division Support to the U.S. Environmental Protection Agency. Technical memo.
National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Lab.
E. M. Poole-Kober, and H. J. Viebrock. Jul 91, 76p NOAA-TM-ERL-ARL-188
See also report for 1989, PB91-141317. Sponsored by Environmental Protection Agency, Washington, DC.

During FY-1990, the Atmospheric Sciences Modeling Division provided meteorological research and operational support to the U.S. Environmental Protection Agency. Basic meteorological operational support consisted of applying dispersion models and conducting dispersion studies and model evaluations. The primary research effort was the development and evaluation of air quality simulation models using numerical and physical techniques supported by field studies. Modeling emphasis was on the dispersion of photochemical oxidants and particulate matter on urban and regional scales, dispersion in complex terrain, and the transport, transformation, and deposition of acidic materials. Highlights included expansion of the Regional Acid Deposition Model/Engineering Model family to consist of the Tagged Species Engineering Model, the Non-Depleting Model, and the Sulfate Tracking Model; completion of the Acid-MODES field study; completion of the RADM2.1 evaluation; completion of the atmospheric processes section of the National Acid Precipitation Assessment Program 1990 Integrated Assessment; conduct of the first field study to examine the transport and entrainment processes of convective clouds; development of a Regional Oxidant Model-Urban Airshed Model interface program; conduct of an international sodar intercomparison experiment; incorporation of building wake dispersion in numerical models; conduct of wind-tunnel simulations of stack-tip downwash; and initiation of the publication of SCRAM NEWS.

Keywords: *Research and development, *Meteorology, *Mathematical models, *Air pollution, Atmospheric models, Atmospheric diffusion, US EPA, Air quality, Deposition, Environmental transport, Photochemical reactions, Acid rain, Dry methods, Wet methods, Global aspects, Atmospheric boundary layer, Aerosols, National Oceanic and Atmospheric Administration.

PB91-235887/REB PC **A07/MF A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Opportunity Assessment Optical Fabrication Laboratory, Fitzsimmons Army Medical Center, Denver, Colorado. Final rept.
Versar, Inc., Springfield, VA.
M. Drabkin, and E. Rissmann. Aug 91, 136p EPA/600/2-91/031
Contract EPA-68-C8-0061
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Under the Waste Reduction Evaluations at Federal Sites (WREAFS) program, RREL has taken the initiative to merge the experience and resources of the EPA with other Federal agencies. At the Fitzsimmons Army Medical Center (FAMC) in Aurora, Colorado, the Army and the EPA cooperated in an assessment of the Optical Lens Fabrication Laboratory (OFL). The OFL is responsible for producing optical lenses, specticals, and special optical products for the services. Processes include both glass and plastic lens fabrication. The assessment at OFL was concerned with two RCRA hazardous wastes, first, the residual lead-bearing glass lens blocking alloy and alkaline washwater from lens deblocking/cleaning operations and, second, the nonhazardous ground glass from lens grinding operations. Three options were identified: Filtration of the alkaline washwater from glass lens deblocking/washing operations to recover and recycle residual lead-bearing blocking alloy particulates. Potentially 500 lb./yr. of the alloy is reclaimable. Substitution of Lead-free glass lens blocking alloy for the lead-bearing material presently used. Offsite recycling of the nonhazardous fine glass particulate waste generated in the lens grinding operation and currently disposed of in a sanitary landfill.

Keywords: *Waste management, *Optical glass, *Lenses, Lead(Metal), Hazardous materials, Cleaning, Washing, Waste water, Waste recycling, Grinding, Operations, Materials recovery, *Waste minimization, *Source reduction, *Optical Lens Fabrication Laboratory, Resource Conservation and Recovery Act.

PB91-236018/REB PC **A03/MF A01**
Montana State Dept. of Health and Environmental Sciences, Helena.
Affordability of Major Wastewater Systems Improvements for Small Montana Communities. Special rept.
Montana Dept. of Commerce, Helena.
J. E. Richard. Oct 90, 45p
Grant T-901808-01-0
Sponsored by Montana State Dept. of Health and Environmental Sciences, Helena, and Environmental Protection Agency, Helena, MT.

The purpose of the study, contracted by the Montana Department of Commerce, was to review available statewide data and study four small Montana communities with existing sewer system deficiencies to determine the financial feasibility of installing new systems -- given the existing financing mechanisms currently available.

Keywords: *Sewage treatment plants, *Water pollution abatement, *Small cities, *Economic analysis, *Maintenance costs, Case studies, Montana, Benefit cost analysis, Local government, Operations, Public health, Performance standards.

PB91-236422/REB PC **A06/MF A02**
Illinois Dept. of Energy and Natural Resources, Springfield. Office of Solid Waste and Renewable Resources.
Used Oil Management in Illinois.
Illinois Univ. Center for Solid Waste Management and Research, Chicago. Office of Technology Transfer.
B. A. Hegberg, W. H. Hallenbeck, and G. R. Brenniman. Jul 91, 123p OTT-10
Sponsored by Illinois Dept. of Energy and Natural Resources, Springfield. Office of Solid Waste and Renewable Resources.

The purpose of the report is to identify the issues surrounding used oil disposal and reuse. The discussion includes lack of government regulation at some levels, too much regulation at other levels, liability of municipalities in used oil disposal, the potentially hazardous (waste) nature of used oil, and the generation of used oil in Illinois. In addition, mechanisms which will increase used oil collection are reviewed: government regulations, mandatory used oil recycling, recovery of oil from waste oil filters, appropriate levels of permitting for municipal used oil collection facilities, industrial minimization and recycling, government and company involvement, public education, and consumer collection programs. Finally, existing and proposed federal regulations, and Illinois siting requirements are reviewed.

Keywords: *Waste management, *Illinois, *Waste oils, Waste recycling, Waste disposal, Pollution regulations, Collection systems, State government, Liabilities, Regulations, Waste minimization.

PB91-238584/REB PC **A02**/MF **A01**
Considerations in Ground Water Remediation at Superfund Sites.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
18 Oct 89, 10p OSWER DIRECTIVE-9355.4-03

The directive transmits findings from a study of several sites where ground water extraction is being conducted to contain or reduce levels of contaminants in the ground water. The memorandum also presents several recommendations for modifying the Superfund approach to ground water remediation.

Keywords: *Superfund, *Hazardous materials, *Waste management, *Water pollution control, Remedial action, Ground water, Extraction, *Office of Solid Waste and Emergency Response.

PB91-238592/REB PC **A12**/MF **A03**
Superfund Technical Assistance Grant (TAG) Handbook.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 90, 268p EPA/540/G-88/001, OSWER DIRECTIVE-9230.1-03

The handbook is designed to guide the reader through the entire Technical Assistance Grant (TAG) Program, from applying for the grant to selecting a technical advisor and managing a TAG project. The handbook explains federal policies, procedures, and regulations related to the TAG Program and provides detailed instructions on how to complete necessary grant forms. The handbook is intended for those who have already submitted a Letter of Intent.

Keywords: *Superfund, *Waste management, *Hazardous materials, Guidelines, Grants, Handbooks, Technical assistance, Regulations, Administrative procedures, Forms(Paper), Management planning, Requirements, *Office of Solid Waste and Emergency Response, *Technical Assistance Grant Program.

PB91-238725/REB PC**$675.00**
National Priorities List Book Set.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1991, 4262p-in 51v
Set includes PB91-921207 and PB91-921209 through PB91-921258.

The report provides general Superfund background information and descriptions of activities at each State National Priorities List (NPL) sites. The set of documents compiles State-Specific site summary fact sheets on each site being cleaned up under the Superfund program. The individual state sites are available as PB91-921207, and PB91-921209 thru PB91-921258.

Keywords: *Hazardous materials, *Pollution control, Sites, States(United States), Describing, *Superfund, Priorities list, Clean-up.

PB91-238733/REB PC **A14**/MF **A03**
Citizens' Guidance Manual for the Technical Assistance Grant Program. Directive.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Jun 88, 325p

The manual is designed to help citizens' groups apply for and manage a technical assistance grant. It is written as a self-help guide in an easy-to-understand manner. Step-by-step instructions for completing various forms are included throughout the manual. In addition, copies of blank forms have been included for easy reference.

Keywords: *Superfund, *Hazardous materials, *Waste management, Citizen participation, Technical assistance, Grants, Manuals, Guidelines, Forms(Paper), Requirements, Procurement, Remedial action, Administrative procedures, *Office of Solid Waste and Emergency Response, *Technical Assistance Grant Program.

PB91-239046/REB PC **A05**/MF **A01**
Determination of Water Use in Rockford and Kankakee Areas, Illinois. Water resources investigation.
Geological Survey, Reston, VA. Water Resources Div.
J. K. LaTour. 1990, 81p USGS/WRI-90-4166
Prepared in cooperation with Illinois State Environmental Protection Agency, Springfield.

The report (1) describes the water-use data available from water-utility managers and water users in the Rockford and the Kankakee areas of Illinois during 1984, (2) presents an evaluation of the accuracy of these data, and (3) describes methods and water-use coefficients for estimating water use. The report contains data and estimates on water withdrawal, delivery, consumptive use, release, return, and conveyance loss and gain for six communities served by the public-water systems of the Rockford and the Kankakee areas. The water-use categories studied were commercial, industrial, domestic, and municipal uses; public supply; and sewage treatment. Water-use information for the first four categories is limited to water users that receive water from a public-water supplier and (or) release water to a sewage-treatment plant in the Rockford and the Kankakee areas.

Keywords: *Water utilization, *Water supply, *Water management(Applied), Illinois, Study estimates, Data processing, Withdrawal, Water consumption, Industrial water, Sewage treatment, Domestic water, Potable water, Comparison, Consumptive use, *Rockford(Illinois), *Kankakee(Illinois).

PB91-240432/REB PC **A99**
Subtitle D Industrial Facility Telephone Survey Report (1987).
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
L. Hearns. Aug 91, 2270p EPA/530/SW-91/069

The main objectives of the Subtitle D Industrial Facility Telephone Screening Survey (1987) were to develop representative lists of facilities that managed Subtitle D wastes, including landfills, surface impoundments, land application units, and waste piles that are not regulated as hazardous waste handlers and to develop national and industry specific estimates of the number and amount of these facilities of Subtitle D waste that is managed. The sample population was drawn from 17 industry groups that were believed to generate the majority of Subtitle D waste. Data were collected over a period of 6 months, from November 1986 to April 1987. Data gathered in the Industrial Facility Survey was formulated into the report that follows.

Keywords: *Waste management, *Hazardous materials, Earth fills, Ground disposal, Surface impoundments, Data processing, Volume, Industrial wastes, Surveys, *Telephone surveys.

PB91-240457/REB PC **A03**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Multiphase Flow and Transport in Porous Media. Journal article.
Virginia Polytechnic Inst. and State Univ., Blacksburg. Center for Environmental and Hazardous Material Studies.
J. C. Parker. c1989, 20p EPA/600/J-89/542
Pub. in Reviews of Geographics, v27 n3 p311-328 Aug 89. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Multiphase flow and transport of compositionally complex fluids in geologic media is of important in a number of applied problems which have major social and economic effects. In petroleum reservoir engineering, efficient recovery of energy reserves is the principal goal. Unfortunately, some of these hydrocarbons and other organic chemicals often find their way unwanted into the soils and groundwater supplies. Removal in the latter case is predicated on ensuring the public health and safety. In the paper, principles of modeling fluid flow in systems containing up to three fluid phases (namely, water, air, and organic liquid) are described. Solution of the governing equations for multiphase flow requires knowledge of functional relationships between fluid pressures, saturations, permeabilities which may be formulated on the basis of conceptual models of fluid-porous media interactions. Mechanisms of transport in multicomponent multiphase systems in which species may partition between phases are also described, and the governing equations are presented for the case in which local phase equilibrium may be assumed. A number of hypothetical numerical problems are presented to illustrate the physical behavior of systems in which multiphase flow and transport arise. (Copyright (c) 1989 by the American Geophysical Union.)

Keywords: *Multiphase flow, *Transport properties, *Porous materials, *Reservoir engineering, *Water pollution, Hydrocarbons, Capillary flow, Pore pressure, Mathematical models, Engineering geology, Oil reservoirs, Reprints.

PB91-240465/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Assessing Pesticide Risk to Arthropod Natural Enemies Using Expert System Technology. Journal article.
Oregon State Univ., Corvallis. Dept. of Entomology.
R. H. Messing, B. A. Croft, and K. Currans. c1989, 13p EPA/600/J-89/543
Grant EPA-R-812182-01
Pub. in AI Applications Natural Resource Management, v3 n2 p1-11 1989. See also PB90-108192. Sponsored by Corvallis Environmental Research Lab., OR.

A prototype expert system (NERISK) has been developed to help users assess the impact of pesticides on beneficial arthropod predators and parasitoids in agricultural systems. A shell program (RECOG) was adapted with minor modifications to allow the encoding of expert opinion on the topic by persons with minimal computer skills. A procedure was added that allows the user to access databases, simulation models, and other programs from within the expert system, and to use the query and model output as part of an integrated knowledge organization and delivery package. A large database (ca 12,000 records) and several expert opinion components on pesticide effects on natural enemies have been integrated into an easily accessible program. The expert system will help regulatory agents, university research and extension personnel, and production managers make decisions about the integration of pesticides and biological control agents in agricultural production systems.

Keywords: *Biological pest control, *Pesticides, *Arthropoda, *Expert systems, Risk, Data bases, Reprints, *Natural enemies, *NERISK system.

PB91-240473/REB PC **A02**/MF **A01**
Corvallis Environmental Research Lab., OR.
Acidification and Recovery of a Spodosol Bs Horizon from Acidic Deposition. Journal article.
Syracuse Univ., NY. Dept. of Civil and Environmental Engineering.
R. A. Dahlgren, D. C. McAvoy, and C. T. Driscoll.
c1990, 9p EPA/600/J-90/539
Pub. in Environmental Science and Technology, v24 n4 p531-537 1990. Sponsored by Corvallis Environmental Research Lab., OR.

A laboratory study was conducted to examine acidification and recovery of a Spodosol Bs horizon from acidic deposition in the Bear Brook Watershed (BBW) in central Maine. A mechanical vacuum extractor was used to draw solutions through a soil column at three treatments containing 40, 100, or 160 micromol/L SO4(2-). Following 44 d of leaching, all treatments were decreased to the 40 micromol/L SO4(2-) level to examine recovery from acidification. Acidic additions were initially neutralized by release of basic cations and sulfate adsorption. Following attainment of steady state conditions for basic cations and SO4(2-) with respect to the soil adsorption complex, Al dissolution was the primary neutralization mechanism. Aqueous Al activities appeared to be regulated by equilibrium with an Al(OH)3 mineral phase. Following decreases in acid loadings, recovery was rapid resulting in retention of basic cations, reversible release of SO4(2-) and a marked reduction in the concentrations of soluble Al. (Copyright (c) 1990 American Chemical Society.)

Keywords: *Water pollution, *Acidification, *Soil chemistry, *Watersheds, *Deposition, *Water chemistry, Acidic soils, Bear Brook, Maine, Soil profiles, Soil horizons, Air water interactions, Air pollution, pH, Acidic water, Computerized simulation, Thermodynamics, Cations, Acid neutralizing capacity, Land pollution, Reprints, *Spodosols, Central Region(Maine).

PB91-240481/REB PC **A02**/MF **A01**
Quantification of Changes in Lakewater Chemistry in Response to Acidic Deposition. Journal article.
Corvallis Environmental Research Lab., OR.
T. J. Sullivan, D. F. Charles, J. P. Smol, B. F. Cumming, and A. R. Selle. c1990, 6p EPA/600/J-90/540

Pub. in Nature, v345 n6270 p54-58 1990.Portions of this document are not fully legible. Prepared in cooperation with E and S Environmental Chemistry, Inc., Corvallis, OR., Indiana Univ. at Bloomington. Dept. of Biology, Queen's Univ., Kingston (Ontario). Dept. of Biology, and NSI Technology Services Corp., Corvallis, OR. Environmental Research Lab.

Lakewater acidification in New York's Adirondack Mountains was quantified based on paleolimnological reconstructions of pre-1850 chemistry for 49 lakes. Paleolimnology provides a more accurate assessment of regional acification than was previously possible using water chemistry and model calculations alone. Historical depletion of lakewater acid neutralizing capacity (ANC) and increase in labile monomeric Al have been restricted to lakes that are currently low in ANC. Most currently acidic lakes have acidified recently and were not acidic prior to 1850. The percentage of lakes affected and magnitude of the inferred acidification are substantially smaller than generally believed. The results agree, however, with short-term recovery rates previously documented and with spatial patterns in lakewater chemistry across a depositional gradient, and illustrate the importance of watershed and/or in-lake processes in neutralizing acidic atmospheric inputs.

Keywords: *Lakes, *Water pollution, *Paleolimnology, *Acidification, *Water chemistry, *Deposition, Acidic water, Air pollution, Air water interactions, Acid neutralizing capacity, Spatial distribution, New York, Adirondack Mountains, Watersheds, pH, Surface waters, Reprints.

PB91-240499/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Latitudinal and Seasonal Variation in Calculated Ultraviolet-B Irradiance for Rice-Growing Regions of Asia. Journal article.
ManTech Environmental Technology, Inc., Corvallis, OR.
D. Bachelet, P. W. Barnes, D. Brown, and M. Brown.
c1991, 14p EPA/600/J-91/193
Contract EPA-68-C8-0006
Color illustrations reporduced in black and white. Pub. in Photochemistry and Photobiology, v54 n3 p411-422 1991. Prepared in cooperation with Oregon State Univ., Corvallis. Coll. of Oceanography. Sponsored by Corvallis Environmental Research Lab., OR.

Ultraviolet-B (UV-B, 280-320 nm) irradiance was calculated for more than 1200 sites in Asia to characterize the spatial and temporal variation in the present UV-B climate for rice-growing regions. The analytical model of Green et al. was used to compute UV-B irradiance for clear skies using satellite-observed ozone column thickness and local elevation data. Ground-based observations of cloud cover were then used to approximate the average effect of cloud cover on UV-B irradiance using the approach of Johnson et al. Over the geographic range of rice cultivation, the maximum daily effective UV-B irradiance (UV-B(sub BE)) when weighted according to a general plant action spectrum, was found to vary approximately 2.5-fold under both clear and cloudy sky conditions. Under a climate resulting from a doubling of atmospheric carbon dioxide, estimated UV-B using predicted cloud cover was found to change by up to 17% from present conditions in Thailand. Both latitudinal and seasonal variation in solar UV-B radiation may be important aspects of the UV-B climate for rice as cultivars differ in sensitivity to UV-B and are grown under diverse conditions and locations.

Keywords: *Seasonal variations, *Ultraviolet rays, *Rice, *Latitude, *Asia, Ozone, Farm crops, Thailand, Elevation, Climate, Cloud cover, Reprints, Oryza sativa.

PB91-240507/REB PC **A03/MF A01**
Fate of Water Soluble Azo Dyes in the Activated Sludge Process. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
G. M. Shaul, C. R. Dempsey, K. A. Dostal, and T. J. Holdsworth. c1991, 15p EPA/600/J-91/194
Pub. in Chemosphere, v22 n1-2 p107-119 1991. See also PB88-208251.

The objective of the study was to determine the partitioning of water soluble azo dyes in the activated sludge process (ASP). Azo dyes are of concern because some of the dyes, dye precursors, and/or their degradation products such as aromatic amines (which are also dye precursors) have been shown to be, or are suspected to be, carcinogenic. Specific azo dyes were spiked at 1 and 5 mg/L to pilot-scale treatment systems with both liquid and sludge samples collected. Samples were analyzed by high performance liquid chromatography (HPLC) with an ultraviolet-visible detector. Mass balance calculations were made to determine the amount of the dye compound in the waste activated sludge (WAS) and in the activated sludge effluent (ASE). Of the 18 dyes studied, 11 compounds were found to pass through the ASP substantially untreated, 4 were significantly adsorbed onto the WAS, and 3 were apparently biodegraded.

Keywords: *Azo dyes, *Sulfonic acids, *Activated sludge process, *Separation, Adsorption, Biodeterioration, Carcinogens, Effluents, Reprints, Mass balance calculations.

PB91-240515/REB PC **A03/MF A01**
Pilot UV-B Spectrometer Intercomparison Experiment: A Preliminary Report.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
C. B. Baker. 1991, 12p EPA/600/D-91/220
Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div.

The experiment was a preliminary examination of the considerations needed to intercompare ultraviolet spectrometers (UVS). The participants were University of North Carolina (UNC), University of Florida (UF), National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA), Smithsonian Radiation Laboratory (SRL), Atmospheric Environment Service (AES) and National Institute for Standards and Technology (NIST). The experiment was held at the NOAA/EPA's environmental measurement facility in Research Triangle Park, NC. The experiment took place November 5-7, 1990. The pilot intercomparison and was an opportunity to compare available instrumentation, broadband and spectral, for use in monitoring programs. Ultimately the pilot experiment should provide future guidelines for a more complete international intercomparison of instruments, standards and calibrations.

Keywords: *Ultraviolet spectrometers, Near ultraviolet radiation, Interlaboratory comparisons, Atmospheric composition, Cloud cover, Ozone, Intercomparison.

PB91-240523/REB PC **A03/MF A01**
Harmonization of QA Procedures for Environmental Data Operations: Development of a National Consensus Standard for Quality Assurance for Environmental Programs. Symposium proceedings.
Environmental Protection Agency, Research Triangle Park, NC. Quality Assurance Management Staff.
G. L. Johnson, D. W. Wolfe, and S. M. Blacker. Oct 91, 21p EPA/600/D-91/221
Pub. in the Proceedings of the Annual Energy Division Conference (19th) of the American Society for Quality Control, Oct 91. Prepared in cooperation with Bechtel Environmental, Inc., San Francisco, CA., and MAC Technical Services, Germantown, MD.

Decisions on where and how to clean-up Federally-owned facilities contaminated by mixtures of hazardous chemical and radioactive wastes requires that quality environmental data be obtained. The Federal Government is currently using several different standards or sets of requirements for establishing the quality assurance and quality control (QA/QC) procedures associated with environmental data operations for these sites. These standards defined the criteria for the QA activities and documentation required, the content and format of the documentation, and who was responsible for implementation. Shortcomings in these standards of requirements led in 1989 to efforts by several public and private sector groups to 'harmonize' the multiple sets of standards and requirements into a single set. These efforts are being conducted under the auspices of the American Society for Quality Control (ASQC) and involve participation by the Environmental Protection Agency (EPA), Department of Energy (DOE), Department of Defense (DOD), Nuclear Regulatory Commission (NRC), and others in the contractor and regulated communities. The paper describes the progress toward establishing a national consensus standard for QA for environmental programs through the ASQC standard-setting process.

Keywords: *Waste management, *Federal agencies, *Hazardous materials, *Radioactive wastes, *Environmental issues, Superfund, Standards, Requirements, Quality assurance, Quality control, Interagency cooperation, Remedial agencies, Implementation, Performance standards, Comparison, *Cleanup operations, American Society for Quality Control.

PB91-240531/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Elements of the U.S. Carbon Budget: Progress and Preliminary Results. Symposium paper.
ManTech Environmental Technology, Inc., Corvallis, OR.
H. Gucinski, C. Peterson, J. Kern, D. Turner, and D. Pross. 1991, 20p EPA/600/D-91/222
Pub. in Proceedings of PACLIME Symposium Meeting, Monterey, CA., March 10-13, 1991. Prepared in cooperation with Oregon State Univ., Corvallis. Dept. of Geography. Sponsored by Corvallis Environmental Research Lab., OR.

The development of carbon budget for the US is important in terms of (1) comparing the relative magnitudes of biogenic and anthropogenic flux, (2) contributing to the construction of a global carbon budget, (3) evaluating possible carbon sequestration and conservation strategies, and (4) exploring the magnitude and direction of possible feedbacks to climate change mediated by the terrestrial biosphere. Efforts at classification of vegetation type and condition based on existing maps may have large errors. The study, with the use of statistically based inventories, suggests the importance of moving away from pre-existing maps to the creation of new data bases from ground inventories and remote sensing. Ultimately, advances in the areas of GIS, ecosystem modeling, and remote sensing will result in better maps and capabilities to extend country-wide estimates of carbon for the United States to countries or regions of more limited baseline data.

Keywords: *Carbon cycle, *Air-biosphere interactions, *Carbon sources, *Environmental transport, *Atmospheric composition, United States, Study estimates, Pollution sources, Air pollution, Natural emissions, Flux density, Forests, Man-environment interactions, Ecosystems, Biomass, Climatic changes, Carbon sinks.

PB91-240549/REB PC **A03/MF A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Anaerobic Biotransformation of Contaminants in the Subsurface. Environmental research brief.
Oklahoma Univ., Norman. Dept. of Botany and Microbiology.
J. M. Suflita, and G. W. Sewell. Feb 91, 11p EPA/600/M-90/024
Grant EPA-R-812808
Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Anaerobic conditions predominate in contaminated aquifers and are common in noncontaminated areas. Comparatively little is known about degradative processes and nutrient cycling under anaerobic conditions. However, it is apparent these processes are fundamentally different and more complex than comparable aerobic processes. Research in this area is critical to our understanding of the fate of contaminants in the subsurface environment and for the design and operation of efficient and effective treatment technologies. The objective of the research brief is to report the current status of research directed toward defining anaerobic microbial metabolic processes which occur in the subsurface environment.

Keywords: *Research and development, *Subsurface environment, *Water pollution control, *Anaerobic processes, Aquifers, Technology utilization, Design criteria, Performance evaluation, Biotechnology, Microorganisms, Biodeterioration, Nutrients, Remedial action.

PB91-240556/REB PC **A03/MF A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Solubility, Sorption and Transport of Hydrophobic Organic Chemicals in Complex Mixtures. Environmental research brief.
Florida Univ., Gainesville. Dept. of Soil Science.
P. S. C. Rao, L. S. Lee, and A. L. Wood. Mar 91, 16p EPA/600/M-91/009
Grant EPA-R-814512

Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Environmental contamination problems commonly involve wastes consisting of complex mixtures of chemicals. The behavior of these mixtures has not been well understood because the primary chemodynamic properties of organic chemicals have usually been characterized in aqueous solutions which are simple in composition relative to many waste mixtures found at or near disposal/spill sites. The research summarized in the report focuses on the effects which organic cosolvents have on the sorption and mobility of organic contaminants. In general, sorption of organic solutes, especially hydrophobic organic chemicals (HOCs), is inversely related to solubility. Thus, an increase in solubility resulting from the addition of a cosolvent leads to a proportional decrease in sorption and a concomitant increase in mobility. The cosolvency theory used to quantify these cosolvent effects is summarized. The application of this theory to assist in the definition, prediction and remediation of soil and ground water contamination problems is discussed.

Keywords: *Waste management, *Organic compounds, *Waste disposal, *Hazardous materials spills, *Hydrophobic properties, *Research and development, Solubility, Sorption, Environmental transport, Solvents, Mixtures, Physicochemical properties, Water pollution, Land pollution control, Remedial action, Dynamics, Graphs(Charts).

PB91-240564/REB PC **A09**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Comparative Evaluation of Two Extraction Procedures: The TCLP and the EP. Rept. for 1 Oct 86-30 Sep 89.
Army Engineer Waterways Experiment Station, Vicksburg, MS.
R. M. Bricka, T. T. Holmes, and M. J. Cullinane. Sep 91, 187p EPA/600/2-91/049
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Two studies were conducted to compare the results of the Toxicity Characteristic Leaching Procedure (TCLP) with those of the Extraction Procedure Toxicity Characteristic (EP). In the first study, a synthetic heavy metal waste was chemically solidified/stabilized with and without a variety of interfering compounds. The solidified/stabilized waste was cured for 28 days and subjected to the TCLP and EP extractions. The extracts were analyzed for Cd, Cr, Ni, and Hg. In the second study, two solidified/stabilized, heavy metal wastes and an untreated perchloroethene (PCE) still-bottom waste were used. Twelve volatile organic compounds were added to each waste type at two ratios. The EP and TCLP were performed on three samples from each waste type. The extract from each sample was analyzed for As, Ag, Ba, Cd, Cu, Ni, Pb, and Zn and the 12 volatile organic compounds. The losses due to the mechanics of the TCLP and EP extracts with know concentrations of organic compounds before and after extracting the wastes. Results of these studies indicate that, for most of the metal contaminants, the TCLP and EP produce similar results when TCLP extraction fluid 2 (acetic acid solution) is used but differ when TCLP extraction fluid 1 (acetate buffer) is used. The results of testing for volatile organic contaminants indicate that, for 8 of the 12 contaminants, the concentrations measured in the TCLP leachates were significantly greater that those measured in the EP leachates.

Keywords: *Risk assessment, *Hazardous materials, *Waste management, *Solidification, *Stabilization, Water pollution abatement, Pollution regulations, Environmental effects, Comparison, Heavy metals, Separation, Quality assurance, Quality control, Environmental transport, Extractions, Volatile organic compounds, Procedures, Performance evaluation, Leaching, Ground disposal, *Extraction Procedure Toxicity Characteristic tests, *Toxicity Characteristic Leaching Procedure, Land Disposal Restrictions, EPA method 1311, Resource Conservation and Recovery Act.

PB91-240572/REB PC **A04**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Evaluation of Alternative Treatment Technologies for CERCLA Soils and Debris (Summary of Phase 1 and Phase 2).
PEI Associates, Inc., Cincinnati, OH.
B. B. Locke, M. M. Arozarena, C. D. Chambers, J. A. Hessling, and E. Alperin. Sep 91, 71p EPA/600/2-91/050
Contract EPA-68-03-3389
Prepared in cooperation with International Technology Corp., Knoxville, TN., and Bruck, Hartman and Esposito, Inc., Cincinnati, OH. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The study was conducted in two phases. In the first phase, a synthetic soil matrix was prepared as a theoretical composite of Superfund soils nationwide. In the second phase, soils from actual Superfund sites were treated. Three treatment technologies were evaluated in both phases: (1) chemical treatment (KPEG), (2) physical treatment (soils washing), and (3) low-temperature thermal desorption. The Phase I study also included the evaluation of incineration and stabilization. Comparison of results obtained in the treatment of Superfund soils and the synthetic soils reveals that the trend in contaminant removals was similar for both types of soils. The percentage removal, however, was higher for synthetic soils than for actual Superfund soils. This can be attributed to the fact that the synthetic soils were spiked and tested without allowing much time for sorption of the contaminant onto the soils. In contrast, the actual Superfund soils had weathered for long periods of time before treatment was attempted; therefore, contaminant removal was shown to be more difficult on the actual soils.

Keywords: *Soil treatment, *Waste treatment, *Superfund, *Remedial action, Soil contamination, Technology utilization, Substitutes, Physical treatment, Desorption, Low temperature tests, Stabilization, Incineration, Performance evaluation, Chemical treatment, Soil washing.

PB91-241877/REB PC **A15**/MF **A03**
General Preamble: Implementation of Title I Clean Air Act Amendments of 1990. Staff working draft.
Environmental Protection Agency, Washington, DC.
7 Jun 91, 345p

The purpose of the document is to provide guidance to assist States in preparing new State implementation plans pursuant to Title I of the 1990 Clean Air Act Amendments. The present document, a staff working draft version of the General Preamble for Title I, will provide the focus for the public meeting scheduled for June 25-26, 1991. In its final form the document will discuss all pollutants. Final staff work products for particulate matter, sulfur dioxide, and lead are included in the Appendices to the document. The Appendices will eventually be incorporated into the main text, as indicated by the Table of Contents. The EPA plans to publish the final document in the Federal Register in late 1991.

Keywords: *State implementation plans, *Guidelines, *Air pollution standards, Particles, Sulfur dioxide, Lead(Metal), Ozone, Carbon monoxide, Law enforcement, National Ambient Air Quality Standards, Pollution regulations, Requirements, Air pollution control, Air pollution abatement, Stationary sources, *Clean Air Act of 1990.

PB91-242362/REB PC **A12**/MF **A03**
Enhancing State Superfund Capabilities: Nine-State Study.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Dec 90, 259p OSWER DIRECTIVE-9375.6-09
Prepared in cooperation with Environmental Law Inst., Washington, DC.

Nine (9) state hazardous substance cleanup programs were studied in depth in 1989 to determine what elements of funding, enforcement, program organization and other factors are important to state capabilities. Those studied were Colorado, Illinois, Minnesota, New Hampshire, New Jersey, North Carolina, Oregon, Pennsylvania, and Texas. The states were selected to provide a cross-section of large and small programs, new and older programs, geographic diversity, and special program features. The findings of the study, prepared by the Environmental Law Institute for the Office of Policy Planning and Evaluation (OPPE), are reported in two parts. Part One synthesizes the results across states and draws conclusions concerning means of enhancing programs. Part Two reports on each of the states studied and shows how program features combine in the context of operating programs.

Keywords: *Superfund, *Hazardous materials, *Waste management, *State programs, Funds, Remedial action, Law enforcement, State planning, Colorado, Illinois, Minnesota, New Hampshire, New Jersey, North Carolina, Oregon, Pennsylvania, Texas, Operations, *Cleanup operations.

PB91-242370/REB PC **A02**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Macrodispersion and Spatial Variability of Hydraulic Conductivity in a Sand and Gravel Aquifer, Cape Cod, Massachusetts. Environmental research brief.
Geological Survey, Marlborough, MA.
K. M. Hess, S. H. Wolf, M. A. Cella, and S. P. Garabedian. Jan 91, 10p EPA/600/M-91/005
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

A natural-gradient tracer test was conducted in which the transport of bromide, a nonreactive tracer, was monitored in a sand and gravel aqifer for two years. From analyses of spatial moments of the distribution of bromide at 16 times during the test, a dispersivity tensor was calculated for the field transport experiment. As a complementary effort, detailed investigations of the variability of K in the aquifer were made at the tracer-test site, and the stochastic transport equations developed by Gelhar and Axness (1983) were used in conjunction with the statistical analysis of the K data to estimate macrodispersion for the aquifer. Estimates of macrodispersivity based on the statistical analysis of the K distribution agreed well with the macrodispersivity calculated from the tracer test. Two methods of measuring K were also evaluated: permeameter analyses of cores and flowmeter tests in wells. Geostatistical analyses of these data yielded estimates of the mean, variance, and correlations scales for the K distribution in the aquifer.

Keywords: *Research and development, *Aquifers, *Tracer studies, *Environmental transport, *Hydraulic conductivity, *Water pollution, Spatial distribution, Path of pollutants, Stochastic processes, Statistical analysis, Sand aquifers, Gravels, Ground water, Bromides, Cape Cod(Massachusetts), *Macrodispersion.

PB91-242388/REB PC **A14**/MF **A03**
Environmental Protection Agency, Washington, DC. Criteria and Standards Div.
Technologies and Costs for Ground Water Disinfection. February 1991 Edition. Draft rept.
Pirnie (Malcolm), Inc., White Plains, NY.
Feb 91, 308p EPA/570/9-91/013
Contract EPA-68-01-6989
Sponsored by Environmental Protection Agency, Washington, DC. Criteria and Standards Div.

The document was developed to support the Ground Water Disinfection Rule (GWDR). The GWDR will establish treatment requirements for control of microbial contaminants in ground water not under the direct influence of surface water. The document identifies best technologies or generally available means for community or non-community ground water systems to inactivate microbial contaminants. Viruses are the most likely organisms to occur in ground waters and are the focus of the inactivation requirements. Non-treatment options are also discussed. Sections include one on currently available disinfection technologies and conditions under which application is appropriate, but it does not go into detail about operation and maintenance. Another presents criteria which would allow systems to avoid disinfection or provide lower levels. Others provide design assumptions used to develop cost estimates and cost estimates for each technology for various system size categories.

Keywords: *Ground water, *Disinfection, *Microorganism control(Water), *Water treatment, *Potable water, Best technology, Water supply, Viruses, Technology utilization, Water pollution control, Design criteria, Cost estimates, Performance evaluation, Diseases, Pollution regulations, *Ground Water Disinfection Rule, Surface Water Treatment Rule.

PB91-242396/REB PC **A14/MF A03**
Subtitle D Municipal Landfill Survey Report (1986).
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Aug 91, 319p EPA/530/SW-91/070
See also PB89-118525.

The Subtitle D Muncipal Landfill Survey (1986) includes information from a target population of 1,250 facilities who were sent a mail questionnaire in November 1986. The sample population consisted of all municipal landfills in the U.S. and territories that had at least one active landfill unit as of November 1, 1986. Closed landfill units and planned landfill units were also surveyed if they were located at a facility that had at least one active landfill unit. Information gathered in the Municipal Landfill Survey was formulated into the report that follows.

Keywords: *Earth fills, *Municipal wastes, *Environmental surveys, *Solid waste disposal, United States, Closures, Tables(Data), Air pollution sampling, Water pollution sampling, Volume, Concentration(Composition), Monitoring, Surveys.

PB91-242404/REB PC **A07/MF A02**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Procedures for Preparing Emissions Projections.
Pechan (E.H.) and Associates, Inc., Springfield, VA.
Jul 91, 137p EPA/450/4-91/019
Contract EPA-68-D-00120
See also PB-250 680. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The purpose of the document is to provide guidance for projecting emissions to future years. It focuses primarily on procedures for projecting how the combination of future emission controls and changes in source activity will influence future air pollution emission rates. While many of the procedures in the document can be applied to other pollutants (i.e., PM-10, SO2, and toxics), the methods are directed towards ozone precursors and carbon monoxide. Later guidance should more specifically address other pollutants. Software which incorporates the techniques outlined in the document is expected to be released in the spring of 1992. This will be accomplished by modifying the Emission Preprocessor System to include the effects of growth and controls. In the long term -- over the next three years -- EPA plans to develop a new emission preprocessor (Emissios Preprocessor Analysis Module) which will also simulate growth and control effects.

Keywords: *Air pollution forecasts, Procedures, Guidelines, Air pollution control, Pollution sources, Forecasting, Ozone, Case studies, Point sources, Mobile pollutant sources, Emission factors, Air pollutant abatement, Carbon monoxide, State implementation plans, Regional analysis, Natural emissions, *Emission inventories, Area sources.

PB91-242412/REB PC **A04/MF A01**
User's Guide to the Personal Computer Version of the Biogenic Emissions Inventory System (PC-BEIS).
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
T. E. Pierce, and K. A. Baugues. Jul 91, 63p EPA/450/4-91/017
See also PB91-136549.

The Personal Computer version of the Biogenic Emissions Inventory System (PC-BEIS) has been developed to allow users to estimate hourly emissions of biogenic non-methane hydrocarbon emissions for any county in the contiguous United States. PC-BEIS has been compiled using Microsoft FORTRAN and tested on IBM-compatible personal computers. The source code was written in ANSI FORTRAN 77 and should be transportable to most other computers. Emission rates depend on land use, leaf biomass, and emission factors. PC-BEIS also includes adjustments due to temperature and sunglight. A simple leaf energy balance module is included to allow more refined calculations of leaf temperature and sunlight through forest canopies. The user's guide briefly describes the technical background, provides an overview of computer aspects, and shows an example test case.

Keywords: *User manuals(Computer programs), *Computerized simulation, *Natural emissions, *Air pollution, Study estimates, Non-methane hydrocarbons, Volatile organic compounds, United States, Case studies, Temperature, Baseline measurements, Canopy, Land use, Emission factors, Leaves(Botany), Sunlight, Biomass, *Emission inventories, *Biogenic Emissions Inventory System.

PB91-242420/REB PC **A09/MF A02**
Membranes for Drinking Water Treatment.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
B. W. Lykins. Sep 91, 181p EPA/600/9-91/033
Presented at the Membranes Workshop, Cincinnati, OH., August 6, 1990.

Various treatment technologies have proven effective in controlling halogenated disinfection by-products such as precursor removal and the use of alternative disinfectants. One of the most promising methods for halogenated by-product control includes removal of precursors before disinfection. Research studies in Florida indicate that membranes are effective in removing halogenated by-product precursors from certain waters. However, can membranes be used as effectively in other locations for most drinking waters so that they can be considered BAT for disinfection by-products. There are also other regulatory concerns where membranes can provide adequate treatment. Membranes can be used for removing inorganics and radionuclides. Also, with appropriate pilot-scale and field-scale data, membranes could possibly be considered BAT for meeting the Surface Water Treatment Rule requirements. In order to discuss some of these issues, a membrane workshop was held in Cincinnati, Ohio on August 6, 1990 at EPA's Andrew W. Breidenbach Environmental Research Center.

Keywords: *Water treatment, *Potable water, *Membranes, *Water pollution control, Disinfection, Byproducts, Halogen organic compounds, Best technology, Performance standards, Graphs(Charts), Pretreatment process.

PB91-242446/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Air Cleaners for Indoor Air Pollution Control (Chapter 10). Book chapter Feb 89-Jul 90.
Research Triangle Inst., Research Triangle Park, NC.
A. S. Viner, K. Ramanathan, J. T. Hanley, D. D. Smith, and D. S. Ensor. 1991, 19p EPA/600/D-91/223
Grant EPA-R-814169
Pub. in Indoor Air Pollution, p115-131 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The chapter describes an experimental study to evaluate performance characteristics of currently available controls for indoor air pollutants, including both particles and gases. The study evaluated the particle-size-dependent collection efficiency of seven commercially available devices for particulate control: a common furnace filter, four industrial filters, and two electronic air cleaners (EACs). The furnance filter had negligible effect on particles with diameters between 0.1 and 1 micrometer. The industrial filters, with ASHRAE ratings of 95, 85, 65, and 40% showed minimum efficiency at about 0.1 micrometer, which was substantially less than the ASHRAE efficiency. One EAC, essentially a furnance filter with a high-voltage electrode, reached a maximum efficiency of 30% at low flowrates (7 cu m/min); however, it had a negligible effect at higher flowrates. The other EAC, similar to an industrial ESP, showed efficiencies of 80-90% over the entire size range at low to moderate flowrates. At the highest flowrate, a minimum efficiency was detected at 0.35 micrometer. The study also evaluated the suitability of commerically available carbon-based sorbents (wood, coal, and coconut) for removing low concentrations of volatile organic compounds (benzene, acetaldehyde, and 1,1,1-trichloroethane).

Keywords: *Air pollution control, *Indoor air pollution, Performance evaluation, Air cleaners, Dust filters, Sorbents, Volatile organic compounds, Particulates, Stationary sources, Reprints.

PB91-242453/REB PC **A03/MF A01**
Statistical Problems (and Some Solutions) Associated with Testing for Effects in Developmental Toxicology.
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
R. W. Setzer. 1991, 18p EPA/600/D-91/224
Presented at the symposium Risk Assessment of Prenatally-Induced Adverse Health Effects, Berlin, Germany, May 21-23, 1991.

Data from developmental toxicology present several problems from the standpoint of statistical testing. The concurrence of the litter effect (the correlation of responses of littermates), the large number of endpoints to be evaluated, and the fact that most developmental toxicology endpoints are quantal raises the need for unique statistical solutions for hypothesis testing. The paper reviews methods that have been developed to accomodate these problems, particularly those having to do with the litter effect, compares them with respect to power, and speculates on the structure of models that may incorporate more biological information about the nature of the litter effect.

Keywords: *Teratogenic compounds, *Toxicology, Fetus, Multivariate analysis, Statistical analysis, Laboratory animals, Litter effect.

PB91-242461/REB PC **A02/MF A01**
Department of Energy, Washington, DC.
Influence of 50-Hz Electric and Magnetic Fields on Neurite Outgrowth in Pheochromocytoma Cells.
Health Effects Research Lab., Research Triangle Park, NC.
C. Blackman, S. Benane, D. House, and M. Pollock.
1991, 10p EPA/600/D-91/225
Contract DE-AI01-89CE34024
Sponsored by Department of Energy, Washington, DC.

The study describes the ability of electric and magnetic fields to substitute for nerve growth factor in the stimulation of neurite outgrowth in a subline of PC-12 cells, derived from a pheochromocytoma in rat adrenal medulla. The cells were plated on collagen-coated, 60-mm plastic petri dishes and exposed to sinusoidal 50-Hz magnetic fields for 22 hours in a 5% CO2 incubator at 37 C. Two 1000-turn coils, 20 cm in diameter, were assembled in a Helmholtz configuration to generate a magnetic field in a vertical orientation, thereby inducing a companion electric field. A co-netic metal shield housed the control samples in the same incubator. Total cells and number of cells with neurites at least as long as the cell diameter or having a growth cone were counted within an annulus of 1.7 to 1.8 cm radii. Sham exposure demonstrated no difference in % of cells with neurites between the exposed and control locations in the incubator. Exposures were done at 420, 230, 120, 42, 31, 22, 9 and 4.2 milliGauss (mG). At the dish radius of 1.7-1.8 cm these flux densities induced electric fields of 115, 63, 33, 12, 8.5, 6.0, 2.5 and 1.2 microV/m, respectively. At each field strength, there were two control dishes and six exposed dishes, except for 5 exposure dishes at 120 mG. The results demonstrate that electric and magnetic fields stimulate neurite outgrowth in a field strength-dependent manner between 22 and 42 mG (6.0 and 12 microV/m), reaching an apparent stimulation plateau between 42 and 420 mG(12 and 115 microV/m).

Keywords: *Pheochromocytoma, *Electric fields, *Magnetic fields, *Nerves, Nerve growth factor, Cultured tumor cells, Growth, Adrenal medulla, Binding sites.

PB91-242479/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Comparison of the Methyl Reductase Genes and Gene Products. Journal article.
Ohio State Univ., Columbus. Dept. of Microbiology.
C. F. Weil, B. A. Sherf, and J. N. Reeve. c1991, 10p EPA/600/J-89/544
Grant EPA-R-812774, Contract N00014-86-K-0211
Pub. in Canadian Jnl. of Microbiology, v35 n1 p101-108 Jan 89. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab., Office of Naval Research, Arlington, VA., and Department of Energy, Washington, DC.

The DNA sequences encoding component C of methyl coenzyme M reductase (mcr genes) in Methanothermus fervidus, Methanobacterium thermoautotrophicum, ethanococcus vannielii, and Methanosarcina barkeri have been published. Comparisons of transcription initiation and termination sites and of the amino acid sequences of the mcr gene products are presented. Structural features conserved within the amino acid sequences are identified and a comparison of

methyl reductase with other disulfide bond synthesizing enzymes is presented.

Keywords: *Genes, *Methanogenic bacteria, Disulfides, Genetic transcription, Comparison, Structural bacterial genes, Amino acid sequence, Base sequence, Molecular cloning, Lipoamide dehydrogenase, Reprints, *Methyl reductase, Methanothermus fervidus, Methanobacterium thermoautotrophicum, Methanococcus vannielii, Methanosarcina barkeri.

PB91-242487/REB PC **A03**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Vertical Integration of Three-Phase Flow Equations for Analysis of Light Hydrocarbon Plume Movement. Journal article.
Virginia Polytechnic Inst. and State Univ., Blacksburg. Center for Environmental and Hazardous Material Studies.
J. C. Parker, and R. J. Lenhard. c1989, 22p EPA/600/J-89/545
Pub. in Transport in Porous Media 5, p187-206 1989. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Groundwater contaminatioon due to surface spills or subsurface leakage of hydrocarbon fuels, organic solvents, and other immiscible organic liquids is a widespread problem. Numerical models for phase-separated hydrocarbon migration in the vadose zone and groundwater have been presented recently by various researchers. Most analyses have been restricted to consideration of two-dimensional domains involving a vertical slice through unsaturated and/or saturated zones. In the report a mathematical model is derived for areal flow of water and light hydrocarbon in the presence of gas at atmospheric pressure. Vertical integration of the governing three-dimensional, three-phase flow equations is performed under the assumption of local vertical equilibrium to reduce the dimensionality of the problem to two orthogonal horizontal directions. Independent variables in the coupled water and hydrocarbon areal flow equations are specified as the elevation of zero gauge hydrocarbon pressure (air-oil table) and the elevation of zero gauge water pressure (air-water table). Constitutive relations required in the areal flow model are vertically integrated fluid saturations and vertically integrated fluid conductivities as functions of air-oil and air-water table elevations. Closed-form expressions for the vertically integrated constitutive relations are derived based on a three-phase extension of the Brooks-Corey saturation-capillary pressure function. Reduction in dimensionality combined with dimished nonlinearity, makes the vertically integrated water and hydrocarbon model an efficient formulation for analyzing field-scale problems involving hydrocarbon spreading or recovery under conditions for which the vertical equilibrium assumption is expected to be a satisfactory approximation.

Keywords: *Mathematical models, *Hydrocarbons, *Environmental transport, *Water pollution, *Ground water, Three-dimensional calculations, Plumes, Water flow, Hazardous materials spills, Leakage, Multiphase flow, Vertical migration, Soil properties, Land pollution, Immiscibility, Reprints.

PB91-242495/REB PC **A02**/MF **A01**
Characterization of Environmental Tobacco Smoke. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
G. Lofroth, R. M. Burton, L. Forehand, S. K. Hammond, and R. L. Seila. c1989, 8p EPA/600/J-89/546
Pub. in Environmental Science and Technology, v23 n5 p610-614 May 89. Prepared in cooperation with Environmental Health Research and Testing, Inc., Research Triangle Park, NC., and Massachusetts Univ. Medical School, Worcester.

Environmental tobacco smoke (ETS) has been analyzed with respect to several components following smoking of research cigarettes in an experimental chamber. Parameters analyzed and their airborne yeild per cigarette included: particulate matter (10 mg) and its mutagenic activity in a Salmonella bioassay, carbon monoxide (67 mg), nitrogen oxides (2 mg), nicotine (0.8-3.3 mg), formaldehyde (2 mg), acetaldehyde (2.4 mg), acrolein (0.56 mg), benzene (0.5 mg) and several unsaturated aliphatic hydrocarbons (e.g., 1,3-butadiene) of which isoprene (3.1 mg) had the highest yeild. ETS from commercial cigarettes were likewise analyzed in the experimental chamber and at a public location. The relative component composition is similar for the research and commercial cigarettes. All components analyzed were present at concentrations above the background concentrations. Isoprene might be utilized as a tobacco smoke tracer for unsaturated aliphatic hydrocarbons. (Copyright (c) 1989 American Chemical Society.)

Keywords: *Tobacco smoke pollution, *Mutagens, Bioassay, Chemical analysis, Mutagenicity tests, Salmonella, Particulates, Carbon monoxide, Hydrocarbons, Nitrogen oxides, Nicotine, Formaldehyde, Acetaldehyde, Acrolein, Benzene, Isoprene, Reprints, *Environmental tobacco smoke.

PB91-242503/REB PC **A02**/MF **A01**
Passive Smoking on Commercial Airline Flights. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
M. E. Mattson, J. Greenblatt, N. J. Haley, S. K. Hammond, and J. Lewtas. c1989, 8p EPA/600/J-89/547
Pub. in Jnl. of the American Medical Association, v261 n6 p867-872, 10 Feb 89. Prepared in cooperation with National Cancer Inst., Bethesda, MD., Prospect Associates, Inc., Rockville, MD., American Health Foundation, Inc., Valhalla, NY., and Massachusetts Univ. Medical School, Worcester.

In flight exposure to nicotine, urinary cotinine and symptom self-reports were assessed in a study of 9 subjects (5 passengers and 4 attendants) on four routine commercial flights each of approximately 4 hours duration. Urine samples were collected for 72 hours following each flight. Exposures to nicotine measured during the flights using personal exposure monitors were found to be highly variable, with some nonsmoking areas attaining levels comparable to those in smoking sections. Attendants assigned to work in nonsmoking areas were not protected from smoke exposure. The type of aircraft ventilation was important in determining the levels of inflight nicotine exposure. The environmental tobacco smoke levels that occurred produced measurable levels of cotinine (a major metabolite of nicotine) in the urine of passengers and attendants. Passengers who experienced the greatest smoke exposure had the highest levels of urinary cotinine. Changes in eye and nose symptoms between the beginning and end of the flights were significantly related both to nicotine exposure during the flight and to the subsequent urinary excretion of cotinine. In addition, subjects' perceptions of annoyance and smokiness in the airplane cabin were also related to inflight nicotine exposure and urinary excretion measures.

Keywords: *Tobacco smoke pollution, *Commercial aircraft, *Indoor air pollution, Nicotine, Cotinine, Urinalysis, Exposure, Signs and sumptoms, Reprints, *Environmental tobacco smoke.

PB91-242511/REB PC **A03**/MF **A01**
Bioassay-Directed Fractionation of the Organic Extract of SRM 1649 Urban Air Particulate Matter. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
J. Lewtas, J. Chuang, M. Nishioka, and B. Petersen. c1990, 14p EPA/600/J-90/541
Pub. in International Jnl. of Environmental Analytical Chemistry, v39 n3 p245-256 Jul 90. See also PB91-242529. Prepared in cooperation with Battelle Columbus Labs., OH.

Separation of 2 grams of the methylene chloride extraction of NIST SRM 1649 (Washington, D.C. urban air particulate matter) into six compound class fractions by acid-base partitioning and silica gel column chromatography is demonstrated here. Recoveries of organic mass and Salmonella typhimurium TA98 mutagenic activity were greater than 80 percent. The fractionation method showed reproducible distribution of both mass and mutagenic activity; the compound class mass distribution results were similar to those obtained for more typical analytical fractionation of a milligram quantity of the extract mass. The most polar compound class fractions contained the greatest proportions of mutagenic activity. (Copyright (c) 1990 Gordon and Breach, Science Publishers, Inc.)

Keywords: *Aerosols, *Particulates, *Fractionation, *Solvent extraction, *Air pollution, *Bioassay, Urban areas, Mutagenicity tests, Samples, Reprints, *SRM 1649, Standard reference materials.

PB91-242529/REB PC **A03**/MF **A01**
Urban Aerosol Acids: Analysis of National Institute of Standards and Technology Standard Reference Material 1649. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
C. M. Sparacino, S. E. Frazier, M. G. Nishioka, and J. Lewtas. c1990, 16p EPA/600/J-90/542
Pub. in International Jnl. of Environmental Analytical Chemistry, v39 n3 p257-270 Jul 90. See also PB91-242511. Prepared in cooperation with Research Triangle Inst., Research Triangle Park, NC., and Battelle, Columbus, OH.

Urban air particulate matter, collected from Washington, D.C. and certified by the National Institute of Standards and Technology (NIST) as Standard Reference Material 1649, was extracted and fractionated into acid, base and neutral fractions. Each fraction was tested for biological activity using a microbial mutagenesis assay system. The organic acid fraction showed unexpectedly high mutagenic activity, and was subjected to chemical characterization studies. Following derivatization, analysis by GC/MS showed the presence of fatty acids, aromatic acids (including phenolic compounds), and a significant number of compounds that could not be identified from mass spectral compendia. Spectroscopic and elemental analysis data supported the characterization of the fraction as predominantly aromatic. Mass spectra from both GC/MS and direct probe analysis showed the presence of a chlorinated substance, subsequently identified as the fungicide Dichlorophen. The compound was shown to comprise over 50 percent of the mass of the organic acid fraction. A reference standard of Dichlorophen was not mutagenic. The presence of the fungicide in the NIST certified urban aerosol is, in all probability due to artifactual processes. Attempts to concentrate the observed mutagenic activity by preparative chromatography and acid/base partition experiments were not successful. (Copyright (c) 1990 Gordon and Breach, Science Publishers, Inc.)

Keywords: *Aerosols, *Fractionation, *Particulates, *Air pollution, *Bioassay, Samples, Urban areas, Mutagenicity tests, Chemical analysis, Organic compounds, Dichlorophen, Fungicides, Reprints, *SRM 1649, Standard reference materials.

PB91-242537/REB PC **A03**/MF **A01**
Bioassay-Directed Fractionation of 1-Nitropyrene Metabolites: Generation of Mutagrams by Coupling Reverse-Phase HPLC with Microsuspension Mutagenicity Assays. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
J. Lewtas, L. C. King, K. Williams, L. M. Ball, and D. DeMarini. 1990, 11p EPA/600/J-90/543
Pub. in Mutagenesis, v5 n5 p481-489 Sep 90. Prepared in cooperation with North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering.

The authors performed bioassay-directed fractionation of a model complex mixture (rabbit lung S9-generated metabolites of (14)C-radiolabeled 1-nitropyrene) by assaying reverse-phase HPLC fractions using two microsuspension mutagenicity assays. A forward-mutation assay measuring mutation at the gpt locus (8-azaguanine resistance) in Salmonella typhimurium TM677 was performed in a total volume of 100 micro1, and a reverse-mutation assay measuring mutation at the hisD3052 allele in S. typhimurium TA98 was performed in a total volume of 200 micro1. HPLC fractions were collected every 30 s for 45 min, resulting in 90 fractions per run. The HPLC chromatogram (absorbance at 280 nm) and the (14)C profile were compared to the mutagenicity profiles (mutagrams) and to the mutagenic potencies of pure metabolites studied separately. The results indicate that a fine dissection of the mutagenic fractions can be obtained by coupling HPLC to microsuspension mutagenicity assays. Differences observed between the mutagrams generated by the two bacterial strains were most likely due to metabolic (nitroreductase) differences between the two strains. Themethod should be generally applicable to the bioassay-directed chemical analysis of complex mixtures. (Copyright (c) Oxford University Press.)

Keywords: *Mutagens, *Mutagenicity tests, Bioassay, Liquid chromatography, Salmonella typhimurium, Metabolic activation, Lung, Rabbits, Reprints, *Nitropyrenes.

PB91-242545/REB PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Comparing Simulated and Experimental Hysteretic Two-Phase Transient Fluid Flow Phenomena. Journal article.
Battelle Pacific Northwest Labs., Richland, WA.
R. J. Lenhard, J. C. Parker, and J. J. Kaluarachchi.
c1991, 14p EPA/600/J-91/195
Contract DE-AC06-76RLO-1830
Pub. in Water Resources Research, v27 n8 p2113-2124 Aug 91. Prepared in cooperation with Virginia Polytechnic Inst. and State Univ., Blacksburg, and Eidgenoessische Technische Hochschule, Zurich (Switzerland). Sponsored by Department of Energy, Washington, DC., and Robert S. Kerr Environmental Research Lab., Ada, OK.

Computer codes are being increasingly employed to predict movement of chemicals and fluids through the subsurface. A hysteretic model for two-phase permeability (k)-saturation (S)-pressure (P) relations is outlined that accounts for effects of nonwetting fluid entrapment. The model can be employed in unsaturated fluid flow computer codes to predict temporal and spatial fluid distributions. Consideration is given to hysteresis in S-P relations caused by contact angle, irregular pore geometry, and nonwetting fluid entrapment effects and to hysteresis in k-S relations caused by nonwetting fluid entrapment effects. An air-water flow experiment is conducted with a 72-cm vertical soil column where the water table is fluctuated to generate scanning S-P paths. Computer simulations of the experiment employing the hysteretic k-S-P model and a nonhysteretic k-S-P are compared with measured water contents and pressures. Results of the study suggest that consideration should be given to effects of hysteresis in k-S-P relations to accurately predict fluid distributions.

Keywords: *Water pollution, *Computerized simulation, *Two phase flow, *Environmental transport, *Hysteresis, Subsurface investigations, Permeability, Saturation, Pressure, Porous media, Multiphase flow, Fluid flow, Experimental design, Comparison, Physical properties, Land pollution, Reprints.

PB91-242552/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Effect of Satellite Lines from the X-ray Source on X-ray Diffraction Peaks. Journal article Jul-Sep 90.
Acurex Corp., Research Triangle Park, NC.
F. E. Briden, and D. F. Natschke. c1991, 8p EPA/600/J-91/196
Contract EPA-68-02-4701
Pub. in Advances in X-ray Analysis, v34 p501-506 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The article discusses the development of a method for relating reactivity to crystallite size and strain parameters obtained by the Warren-Averbach technique. EPA has been using crystallite size and strain data obtained from x-ray diffraction (XRD) peak profile analysis to predict the reactivity of solid calcium hydroxide sorbent with acid gases in combustion streams. The software used for the calculations requires that the XRD peak profile be corrected with a distribution function before application in the Warren-Averbach analysis. The curve-fitting software, available on the system, includes the Gaussian, Lorentzian, pseudo-Voight, Pearson VII, and Split Pearson VII distribution functions. The function parameters are specified roughly at the start, and the computer algorithm then optimizes the fit parameters by the least squares method. Most of the work has been on calcium hydroxide sorbent materials with calcium fluoride as a standard to account for instrument effects on the peaks. It has been observed that none of the functions produce a satisfactory fit for the experimental XRD peaks.

Keywords: *X ray diffraction, *Calcium hydroxides, *Sorbents, *Spectrum analysis, Crystallites, Chemical reactivity, Combustion products, Air pollution control, Strains, Corrosive gases, Distribution functions, Reprints, Acid gases, Satellite lines.

PB91-242560/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Association of Microorganisms with Surfaces in Distribution Systems. Journal article.
Delaware Univ., Newark. School of Life and Health Sciences.
D. S. Herson, D. R. Marshall, K. H. Baker, and H. T. Victoreen. c1991, 6p EPA/600/J-91/197
Pub. in AWWA Research and Technology, v83 n7 p103-106 Jul 91. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Studies were conducted with particles obtained from a drinking water distribution system. Upon nutrient addition, both the indigenous attached population of bacteria and added coliforms accumulated in association with the particles. This dramatic increase in numbers of organisms associated with the particles was not reflected in plate counts of the particle-containing water. The results indicate potential role of surfaces in harboring organisms that are not detected by sampling the bulk water-until the bacteria are suddenly released into the water.

Keywords: *Distribution systems, *Water pollution sources, *Surfaces, *Potable water, *Microorganisms, Water treatment, Nutrients, Water quality, Bacteria, Water distribution(Applied), Pipes, Coliforms, Reprints.

PB91-242578/REB PC **A02**/MF **A01**
Distribution, Clearance, and Mortality of Environmental Pseudomonads in Mice upon Intranasal Exposure. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
S. E. George, M. J. Kohan, D. A. Whitehouse, J. P. Creason, and C. Y. Kawanishi. c1991, 8p EPA/600/J-91/198
Pub. in Applied and Environmental Microbiology, v57 p2420-2425 Aug 91. Prepared in cooperation with IIT Research Inst., Chicago, IL.

Members of the genus Pseudomonas have a multitude of industrial and agricultural applications and have been implicated in human disease. Because inhalation exposure of humans to these strains during production or application is possible, it is important to determine if there are any adverse health effects associated with these environmental isolates. In the study, strain CD-1 mice were administered P. aeruginosa strain AC869 or P. cepacia strain AC1100 intranasally (i.n.). Morbidity, mortality, and the fate of the microorganisms in the lungs, nasal cavity, and G.I. tract were investigated for 14 days. The LD50 was determined to be 2.7 x 10 to the 7th power CFU. When mice were dosed i.n. with 1.6 x 1000, no overt adverse health effects were observed and the dosed strain was cleared from the lungs and G.I. tract within one day but was detectable in the nasal cavity for 14 days. When mice were treated with 1.6 x 10 to the 7th power CFU, slight morbidity was observed and strain AC869 persisted in the intestinal tract and nasal cavity for 14 days but was absent from the lungs after day 7. P. cepacia strain AC1100 was cleared from the G.I. tract and nasal cavity 2 days after i.n. challenge with 5.3 x 10 to the 8th power CFU, but remained in the lung for 7 days post-treatment. The intestinal tract and nasal cavity, therefore, can serve as reservoirs for environmental pseudomonads upon pulmonary exposure.

Keywords: *Pseudomonas, *Mortality, Health hazards, Exposure, Nose(Anatomy), Mice, Microbial colony count, Gastrointestinal system, Lethal dosage, Respiratory system, Reprints.

PB91-242586/REB PC **A03**/MF **A01**
Diethyldithiocarbamate Potentiates the Neurotoxicity of In vivo 1-Methyl-4-Phenyl-1,2,3,6-Tetrahydropyridine and of In vitro 1-Methyl-4-Phenylpyridinium. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
D. B. Miller, J. F. Reinhard, A. J. Daniels, and J. P. O'Callaghan. c1991, 11p EPA/600/J-91/199
Pub. in Jnl. of Neurochemistry, v57 n2 p541-549 Aug 91. Prepared in cooperation with Wellcome Research Labs., Research Triangle Park, NC.

Diethyldithiocarbamic acid (DDC), a dithiocarbamate, potentiates the neurotoxicity of 1-methyl-r-phenyl-1,2,3,6-tetrahydropyridine (MPTP) in vivo and of its major metabolite, 1-methyl-4-phenylpyridinium (MPP+), in bovine adrenal medullary (BAM) cells maintained in culture. Male C57B1/6 mice were given 2 or 5 injections of MPTP (30mg/kg, i.p.) preceded 0.5 hy by DDC (400 mg/kg, i.p.). The mice were tested for catalepsy, akinesia or motor activity during and after the period of dosing. Systemically administered MPP+ decreased heart NE but did not alter the striatal levels of DA or GRAP & pretreatment with DDC did not alter these effects but did increase lethality. In culture MPP+ (0.3mM) slightly decreased catecholamine levels but had no effect on the tyrosine hydroxylase activity or cellular protein of BAM cells. However, the incubation of these cells with MPP+ and DDC (1.5 or 3.0mM) caused large decreases in all indicators of cell viability. DDC also blocked the uptake of MPP+ into the vesicles of BAM cells. Findings show that DDC increases the neurotoxicity of MPTP in both striatum and hippocampus. One possible explanation for the ability of DDC to potentiate the in vitro effect of MPP+ on BAM cells is that DDC may cause a redistribution of MPP+ at the subcellular level.

Keywords: *Toxicity, *Nervous system, *Diethyldithiocarbamate, Adrenal medulla, Glial fibrillary acidic protein, Corpus striatum, Dopamine, Norepinephrine, Tyrosine hydroxylase, Catalepsy, Cell survival, Mice, In vivo analysis, Reprints, *Methylphenyl tetrahydropyridine, *Methylphenylpyridium.

PB91-242594/REB PC **A02**/MF **A01**
Retrograde Axonal Transport of Locally Synthesized Phosphoinositides in the Rat Sciatic Nerve. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
S. Padilla, and C. N. Pope. c1991, 10p EPA/600/J-91/200
Pub. in Jnl. of Neurochemistry, v57 n2 p415-422 Aug 91. Prepared in cooperation with Northeast Louisiana Univ., Monroe. Toxicology Program.

Although autoradiography has demonstrated local incorporation of (3H)inositol into axonal phospholipids after intraneural injection (Gould, 1976; Gould et at., 1987b), retrograde axonal transport of phosphatidylinositol has only been demonstrated after injection of lipid precursor into the cell body regions (L4 and L5 dorsal root ganglia: DRGs) of the sciatic nerve (Armstron et al, 1985). The authors now report the retrograde axonal transport of inositol phospholipids synthesized locally in the axons. Following microinjection of myo-(3H)inositol into the rat scietic nerve (50-55 mm distal to L4 and L5 DRGs), a time-dependent accumulation of (3H)label occurred in the DRGs ipsilateral (lipsiDRGs to the injection site. The time course of appearance of labeled lipids in the ipsilateral DRGs after injection of precursor into the nerve at various distances from the DRGs indicated a transport rate of at least 5mm/hr. Accumulation of label in the DRGs could be prevented by intraneural injection of colchicine or ligation of the sciatic nerve between the DRGs and the isotope injection site. These results demonstrate that inositol phospholipids synthesized locally in the sciatic nerve are retrogradely transported back to the nerve cell bodies located in the DRG.

Keywords: *Phosphoinositides, *Inositol, *Sciatic nerve, *Axons, Rats, Biological transport, Lipids, Neuroglia, Thin layer chromatography, Phospholipids, Nerve cells, Injections, Reprints.

PB91-242602/REB PC **A02**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Phosphine-Mediated Heinz Body Formation and Hemoglobin Oxidation in Human Erythrocytes. Journal article.
Minnesota Univ., Minneapolis.
W. T. Potter, S. Rong, J. Griffith, J. White, and V. F. Garry. cJun 91, 10p EPA/600/J-91/201
Grant EPA-R-813008
Pub. in Toxicology Letters, v57 n1 p37-45 Jun 91. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

Exposure of human erythrocytes in vitro to phosphine (PH3) induces the development of Heinz body lesions. The lower limit for phosphine mediated Heinz body formation is 1.25 ppm for a four-hour exposure. At exposure levels of 3.0 ppm or higher all erythrocytes are observed to contain Heinz body lesions. These higher phosphine concentration levels have been observed to occur within certain occupational settings. The

mechanism of phosphine mediated Heinz body formation depends upon an oxygen dependent hemoglobin oxidation with initial metHb formation before subsequent protein precipitation and hemichrome formation.

Keywords: *Toxicity, *Erythrocytes, *Phosphines, *Heinz bodies, Methemoglobin, Dose-response relationships, Electron microscopy, Hemoglobin, Oxidation, Reprints.

PB91-242610/REB PC **A02**/MF **A01**
Role of Hyperplastic Nodules in Dichloroacetic Acid-Induced Hepatocarcinogenesis in B6C3F1 Male Mice. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
R. E. Richmond, A. B. DeAngelo, C. L. Potter, and F. B. Daniel. c1991, 7p EPA/600/J-91/202
Pub. in Carcinogenesis, v12 n8 p1383-1387 Aug 91. Prepared in cooperation with Northern Kentucky Univ., Highland Heights. Dept. of Biological Sciences.

Dichloracetic acid (DCA) is a hepatocarcinogen in the male B6C3F1 mouse. It induces primarily hyperplastic nodules (HN) prior to the appearance of hepatocellular adenoma (HA) or carcinoma (HC). The study was undertaken to determine the role of HN in the progression of DCA-induced hepatocarcinogenesis. Five tumor markers were assessed: P21 ras, P39 c-jun, phosphotyrosine (PT), aldehyde dehydrogenase (ALD), and a-fetoprotein (AFP). All were known to be expressed in neoplastic lesions. The results demonstrated: (1) Except for c-jun, HN expressed markers significantly less often than either HA or HC. Equal expression of c-jun occurred in any of the 3 lesion types. (2) HN that were marker positive contained small nests of marker positive hepatocytes among a field of normal appearing unstained hepatocytes. No marker-positive cells were detected in normal appearing liver outside of HN. Altered foci were few and did not express these markers. These results support the idea that the nests within HN are areas of transformed or neoplastic hepatocytes. The absence of marker expression in normal liver and in the AF indicates that HN may be the only significant preneoplastic lesion in DCA-induced carcinogenesis.

Keywords: *Dichloroacetate, *Liver neoplasms, *Hyperplasia, Mice, Biological tumor markers, Adenoma, Carcinoma, Aldehyde dehydrogenase, Alpha fetoproteins, Oncogene proteins, Reprints.

PB91-242628/REB PC **A02**/MF **A01**
Glutamate Neurotoxicity in Rat Auditory System: Cochlear Nuclear Complex. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
L. Schweitzer, K. F. Jensen, and R. Janssen. c1991, 7p EPA/600/J-91/203
Supersedes PB91-191619. Pub. in Neurotoxicology and Teratology, v13 n2 p189-193 Mar 91. Prepared in cooperation with Louisville Univ., KY. School of Medicine.

In other systems such as the hypothalamus and hippocampus, it has been shown that cells postsynaptic with respect to glutamatergic inputs degenerate when exposed to large doses of glutamate ('glutamate neurotoxicity'). The authors have shown that large doses of glutamate administered intraperitoneally are toxic to spiral ganglion cells in the inner ear of the rat. In the present study, they have investigated whether similar levels of glutamate cause alterations in the neurons of the cochlear nuclei. Specifically, they have studied the morphology and size of the cochlear nuclear complex and its subdivisions as well as the size and density of cochlear nucleus neurons following administration of glutamate. The morphological evidence indicates that glutamate caused severe anatomical alteration of the cochlear nuclei. The changes were most pronounced in the anteroventral cochlear nucleus, especially in the neurons that receive terminals of the end bulbs of Held from the cochlear nerve. This could be a direct effect of glutamate in the cochlear nuclei or secondary to degeneration of cochlear nerve fibers in the inner ear. (Copyright (c) Pergamon Press plc, 1991.)

Keywords: *Toxicity, *Nervous system, *Cochlea, *Glutamates, *Auditory nerve, Rats, Neuroglia, Morphology, Nerve cells, Reprints.

PB91-242925/REB PC **A03**/MF **A01**
Modeling the Influence of Active Subslab Depressurization (ASD) Systems on Airflows in Subslab Aggregate Beds. Rept. for May-Aug 91.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
R. B. Mosley. 1991, 12p EPA/600/D-91/226
Presented at the International Symposium on the Natural Radiation Environment (5th), Salzburg, Austria, September 22-28, 1991.

The paper describes a simple model that allows the pressure difference in a subslab aggregate layer to be estimated as a function of radial distance from the central suction point of an active subslab depressurization (ASD) system by knowing the average size, thickness, porosity, and permeability of the aggregate, along with the total flow rate. The flow regimes may span the range from fully developed turbulence, through the transition, to Darcian flow. In order to describe the effect of ASD on radon entry the model should be coupled to a model describing flow through the soil and slab.

Keywords: *Mathematical models, *Air pollution control, *Slabs, *Radon, Indoor air pollution, Stationary sources, Soils, Aggregates, Air flow, *Active subslab depressurization.

PB91-242933/REB PC **A03**/MF **A01**
Characterization of Emissions from an Early Model FFV. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
P. A. Gabele, K. T. Knapp, R. F. Snow, P. D. Siudak, and N. K. Perry. 1991, 20p EPA/600/D-91/227
Presented at the Annual Meeting of the Air and Waste Management Association (84th), Vancouver, British Columbia, June 16-21, 1991. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC.

An emission study was conducted on a 1987 Ford Crown Victoria flexible-fuel vehicle, an early prototype which had been driven about 25,000 miles. The vehicle was designed to run on either gasoline or blends of gasoline and methanol. Emission rates of regulated (hydrocarbons, carbon monoxide, nitrogen oxides, formaldehyde, and methanol) and nonregulated pollutants (speciated organic materials) were determined for both exhaust and evaporative emissions. Some tests were run using federal test procedures, but additional tests employed different driving schedules (New York City Cycle and Highway Fuel Economy Test) and an ambient temperature of 90 F. Both gasoline and a blend containing 85% methanol, 15% gasoline were tested. In the first round of tests, formaldehyde emission rates were somewhat higher than normally observed for similarly aged flexible-fueled vehicles; other emissions were not as elevated. In a second round of tests, the catalyst was replaced with a new one, and carbon monoxide and most organic emissions were substantially reduced. In general, hydrocarbon composition of exhaust emissions was significantly affected by cold starts, slightly affected by driving schedule, and unaffected by ambient temperature, test fuel, and catalyst replacement. Hydrocarbon composition of evaporative emissions was only sensitive to the type of evaporative test being performed: diurnal tests typically had larger fractions of lower molecular weight paraffins than hot soak tests.

Keywords: *Methanol, *Automobile exhaust, *Exhaust emission tests, Nitrogen oxides, Carbon monoxide, Flexibility, Gasoline, Formaldehyde, Test facilities, Evaporative emission measurement.

PB91-242941/REB PC **A03**/MF **A01**
Local and Global Thermoregulatory Responses to MRI Electromagnetic Fields: Biological Effects and Safety Aspects of Nuclear Magnetic Resonance Imaging and Spectroscopy.
Health Effects Research Lab., Research Triangle Park, NC.
C. J. Gordon. 1991, 32p EPA/600/D-91/228
Presented at the New York Academy of Sciences, Bethesda, MD., May 15-17, 1991.

During magnetic resonance imaging (MRI) procedures, a subject is exposed to three novel environmental stimuli which have drawn attention over the past decade as potential health hazards: (1) a relatively intense static magnetic field; (2) a time-varying magnetic field, and (3) a radiofrequency (RF) field. Thermoregulation is one of many physiological systems that can be affected by MRI, specifically by the RF radiation absorbed by the subject during MRI. While there is some sparse, albeit controversial data on the possible effects of static magnetic fields on thermoregulation, the major concern regarding potential health hazards of the MRI-induced thermal effects centers on the RF radiation absorbed by a subject during a scan. The purpose of the paper is to review the studies that have impacted on understanding the thermoregulatory effects of MRI with special emphasis on the problems of selecting appropriate animal models for assessing the potential risk of RF radiation exposure during MRI.

Keywords: *Body temperature regulation, *Electromagnetic fields, *Magnetic resonance imaging, Risk assessment, Health hazards, Radiation hazards, Animal disease models, Humans.

PB91-242958/REB PC **A03**/MF **A01**
Update on Radon Mitigation Research in Schools. Rept. for 1988-Aug 91.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
K. W. Leovic, A. B. Craig, and D. B. Harris. 1991, 18p EPA/600/D-91/229
Presented at the American Association of Radon Scientists and Technologists Meeting, Rockville, MD., October 9-12, 1991.

The paper is an overview of research by EPA's Air and Energy Engineering Research Laboratory (AEERL) on radon mitigation in 47 schools since 1988. The structural and heating, ventilating, and air-conditioning (HVAC) system characteristics of the research schools are presented, along with the mitigation techniques implemented in the schools. Research discussed includes recent and on-going projects in Colorado, Maine, Maryland, Ohio, South Dakota, Tennessee, and Virginia. Initial research focussed on the application of active subslab depressurization (ASD) to school buildings, and recent research has emphasized the ability and limitations of using HVAC systems to reduce radon levels in schools. A goal of future projects is to compare the effectiveness of the two techniques in the same building. Slab-on-grade is the most prevalent substructure in AEERL's research schools and, depending on pressure field extension, ASD systems have been recommended for radon control in many of them. In schools where they have been installed, ASD systems have performed well and are currently being evaluated for long-term performance. The distribution of HVAC system types in these schools is about a third central air handling systems, a third unit ventilators, and a third that do not supply conditioned outdoor air (i.e., fan coil units or radiant heat).

Keywords: *Radon, *Remedial action, *School buildings, *Air pollution control, Stationary sources, Air conditioning, Heating, Ventilation, Research, *Indoor air pollution, Active subslab depressurization.

PB91-242966/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Effect of Ventilation on Emission Rates of Wood Finishing Materials. Journal article Apr 87-Jun 89.
Acurex Corp., Research Triangle Park, NC.
B. A. Tichenor, and Z. Guo. c1991, 8p EPA/600/J-91/204
Contract EPA-68-02-4701
Pub. in Environment International, v17 n4 p317-323 1991. See also PB88-213061. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results from EPA studies on the effect of ventilation (air changes per hour) and material loading on the emission rate for selected organics and total measured organics from three wood finishing materials (stain, polyurethane, and wax). The data are analyzed to show the effect of ventilation on the emission characteristics of each material. The rate of emission of organic compounds from building materials varies according to: type of material, material loading (area of material/volume of room), compound emitted, temperature, humidity, and ventilation rate.

Keywords: *Finishing, *Wood products, *Air pollution control, Ventilation, Emission factors, Polyurethane resins, Waxes, Stains, Organic compounds, Volume, Temperature, Humidity, Rates(Per time), Tests.

PB91-242974/REB PC A02/MF A01
Emission of Organic Substances from Indoor Surface Materials. Journal article Jun 88-Dec 90.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
W. G. Tucker. c1991, 9p EPA/600/J-91/205
Pub. in Environment International, v17 n4 p357-363 1991.

The article discusses the emission of organic substances from indoor surface materials. A wide variety of surface materials in buildings (e.g., Building and maintenance materials, furnishings, clothing, and paper products) can release organic compounds. These sources contribute substantially to the hundreds of organic compounds that have been measured in indoor air. Their emissions have been directly connected to complaints of odors or hyperreactivity, and are presumed to contribute to the problems in many 'sick buildings' where the cause of complaints is uncertain. Significant progress has been made in the past decade in developing procedures for measuring emissions from such materials, in controlled experiments where factors affecting emission rates can be determined and quantified. Emissions data are still limited, but are being accumulated gradually by research groups in Europe and North America. Recent data gathered in research and modeling studies indicate that one of the most effective ways to limit indoor concentrations of organic compounds is to limit the content of volatile compounds in materials that are used in buildings. Limiting the original residual content of such compounds in the materials, or conditionining such materials prior to use in buildings, or (perhaps) conditioning such materials in place before occupancy is most likely to prevent excessive levels.

Keywords: *Emission factors, *Indoor air pollution, *Organic compounds, *Buildings, *Air pollution abatement, Volatile organic compounds, Construction materials, Maintenance equipment, Furniture, Paper products, Odors, Clothing, Building materials, Reprints.

PB91-242982/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Study to Characterize Indoor Particles in Three Non-Smoking Homes. Journal article.
North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering.
R. Kamens, C. T. Lee, R. Wiener, and D. Leith. c1991, 12p EPA/600/J-91/206
Pub. in Atmospheric Environment, v25A n5-6 p939-948 1991. Prepared in cooperation with PEI Associates, Inc., Cincinnati, OH. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Aerosol concentrations and particle size distributions in three middle income homes were characterized over a 3-day period. Occupants of the homes were nonsmokers. A single central sampling location between the kitchen and dining room areas was used in each of the homes. 37 and 47 mm prototype personal sampling inlets were collocated with two fixed PM(Sub 10) dichotomous ambient samplers to determine the average concentration of particulate mass during daytime and evening-early morning sampling periods. Particulate concentrations in the 3 homes ranged from 14 - 42 micrograms/cu m. On the average, 37% of the particle mass was collected in a fine (2.5 micrometers aerodynamic diameter or below) fraction, 26% was observed in a coarse fraction between 2.5 an 10 micrometers, and 37% was found in a fraction equal to or greater than 10 micrometers. Particle concentrations obtained with prototype personal samplers compared reasonably well to those obtained with 10 micrometers ambient air dichotomous samplers. Aerosol size information obtained from automated aerosol instruments suggests that the most significant event for generating small particles in all of the households was cooking. Household vacuum sweeping was the most significant large particle generating event.

Keywords: *Indoor air pollution, *Aerosols, Particle size, Electron microscopy, Air samplers, Temperature, Comparison, Regression analysis, Fungal spores, X-ray diffraction, Reprints.

PB91-242990/REB PC A03/MF A01
Expert System for Estimates of Molecular Weights of Volatile Organic Compounds from Low-Resolution Mass Spectra. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
D. R. Scott. c1991, 15p EPA/600/J-91/207
Pub. in Analytica Chimica Acta 246, p391-403 1991.

MAXMASS, the highest mass with an intensity of 5% of the base peak in a low resolution mass spectrum, has been found to be linearly correlated with the true molecular weights of 400 randomly selected spectra, yielding a family of parellel lines. A simple expert system using MAXMASS has been developed to estimate molecular weights of unknown volatile compounds from their mass spectra. This is an empirical rule-based system which will run on a personal computer. It consists of a classification module chained to separate molecular weight prediction modules for six classes. These are benzenes; chlorobenzenes; bromoalkenes/alkenes; mono- and dichloroalkanes/alkenes; tri-, tetra- and pentachloroalkanes/alkenes; and unknown (other) classes. The rules were derived from National Institute of Standards and Technology (NIST) reference spectra of 75 target toxic compounds from the first five classes and 32 from the unknown class. Performance tests of molecular weight predictions were made with the expert system and the Self Training interpretive and Retrieval System (STIRS) on NIST reference spectra of the 107 training compounds; on a set of 32 test NIST reference spectra of other compounds found in air samples; on a set of 100 randomly selected NIST reference spectra; and on 30 spectra taken from actual field gas chromatography/mass spectrometry samples. (Copyright (c) 1991 - Elsevier Science Publishers B.V.)

Keywords: *Mass spectroscopy, *Volatile organic compounds, *Molecular weight, *Spectrum analysis, *Pattern recognition, Gas chromatography, Toxic substances, Molecular structure, Performance evaluation, Reprints, *Expert systems, Reference spectra.

PB91-243006/REB PC A02/MF A01
Wintertime Measurements of Aerosol Acidity and Trace Elements in Wuhan, a City in Central China. Journal article.
Environmental Protection Agency, Research Triangle Park, NC.
J. M. Waldman, P. J. Lioy, M. Zelenka, L. Jing, and Y. N. Lin. c1991, 10p EPA/600/J-91/208
Pub. in Atmospheric Environment, v25B n1 p113-120 1991. Prepared in cooperation with Rutgers - The State Univ./UMDNJ-Robert Wood Johnson Medical School, Piscataway, NJ. Joint Graduate Program in Toxicology, China National Environmental Monitoring Centre, Beijing, and Wuhan Environmental Protection Inst. (China).

In the People's Republic of China (P.R.C.), the pervasive use of soft coal leads to situations where the concentrations of SO2 and particulate matter approach or surpass those historically observed in London. A cooperative investigation of the effects of air pollution upon the lung function of children in five Chinese cities has been developed among China EPA, U.S. EPA and Robert Wood Johnson Medical School. The paper presents initial results of a winter air pollution field study conducted in Wuhan, one of the selected cities. A 2-week intensive ambient aerosol study was conducted in December 1988 in Wuhan (Hubei Province), a city of nearly 2 million located on the Yangtze River in central China (P.R.C.). This is an industrial region where soft coal burning is widespread, and emission controls for vehicles and industrial facilities are minimal. The sampling site was located in one of the civic centers where residential and commercial density is highest. The purpose of this initial intensive study period was to obtain information on the chemical and physical characteristics of the aerosol species in the urban P.R.C. setting. The focus was the composition and acidity of fine particulate material.

Keywords: *Air pollution sampling, *Aerosols, *Acidification, *Urban areas, Air pollution effects(Humans), Chemical properties, Physical properties, Industrial wastes, Concentration(Composition), Particulates, China, Emission factors, Coal, Exhaust emissions, Winter, Seasonal variations, Sulfur dioxide, Metals, Reprints, *Wuhan(China).

PB91-243014/REB PC A02/MF A01
Age-Related Changes in Receptor-Mediated Phosphoinositide Hydrolysis in Various Regions of Rat Brain. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
W. Mundy, P. Tandon, S. Ali, and H. Tilson. c1991, 8p EPA/600/J-91/210
Pub. in Life Sciences, v49 pPL-97-PL-102 Aug 91. Prepared in cooperation with National Center for Toxicological Research, Jefferson, AR.

The effects of age on cholinergic markers and receptor-stimulated phosphoinositide hydrolysis was examined in the frontal cortex and striatum of male Fischer-344 rats. Choline acetyltransferase activity was decreased 27% in the striatum of aged (24 month) rats compared to young (3 month) controls. Muscarinic receptor density as measured by (3)H-quinuclidinyl benzilate binding showed a similar 26% decrease in the striatum of aged rats. Phosphoinositide hydrolysis was measured by the release of inositol phosphate (IP) from tissue slices prelabeled with (3)H myoinositol in response to carbachol, norepinephrine, and quisqualate. In the cortex, stimulated IP release was significantly greater in slices from aged rats compared to young rats for all three agonists. In contrast, stimulated IP release was significantly decreased in striatal slices from aged rats compared to young for all three agonists. These data indicate a differential effect of age on agonist-stimulated phosphoinositide hydrolysis in the cortex and striatum. The decreased responsiveness in the latter area may result from the age-related loss of postsynaptic receptors.

Keywords: *Aging(Biology), *Phosphoinositides, *Brain, Rats, Hydrolysis, Cerebral cortex, Corpus striatum, Quinuclidinyl benzilate, Muscarinic receptors, Inositol phosphates, Myoinositol, Carbachol, Norepinephrine, Quisqualic acid, Choline acetyltransferase, Reprints.

PB91-243022/REB PC A02/MF A01
Pargyline and gamma-Butyrolactone Enhance Tyrosine Hydroxylase Immunostaining of Nigrostriatal Axons. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
N. Haykal-Coates, J. P. O'Callaghan, J. F. Reinhard, and K. F. Jensen. c1991, 7p EPA/600/J-91/211
Pub. in Brain Research, v556 p353-357, 16 Aug 91. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC., and Wellcome Research Labs., Research Triangle Park, NC.

Administration of pargyline or gamma-butyrolactone enhanced immunostaining of tyrosine hydroxylase immunoreactive axons in the striatum. The qualitative characteristics of the enhancement were compound dependent and the enhancement was not associated with an increase in the amount of tyrosine hydroxylase within the striatum. These results demonstrate the pharmacological enhancement of immunostaining for neurotransmitter synthetic enzymes in the absence of increased synthesis. (Copyright (c) 1991 Elsevier Science Publishers B.V.)

Keywords: *Pargyline, *4-Butyrolactone, *Tyrosine hydroxylase, *Axons, *Substantia nigra, Immunohistochemistry, Pharmacology, Biosynthesis, Neuroregulators, Western blotting, Reprints.

PB91-243030/REB PC A03/MF A01
Glucocorticoids Regulate the Synthesis of Glial Fibrillary Acidic Protein in Intact and Adrenalectomized Rats but Do Not Affect Its Expression Following Brain Injury. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
J. P. O'Callaghan, R. E. Brinton, and B. S. McEwen. c1991, 12p EPA/600/J-91/212
Pub. in Jnl. of Neurochemistry, v57 n3 p860-869 Sep 91. Prepared in cooperation with Rockefeller Univ., New York.

Short (5 days)-to long-term (4 months) corticosterone (CORT) administration by injection, pellet implantation, or in the drinking water decreased glial fibrillary acidic protein (GFAP) by 20-40% in hippocampus and cortex of intact rats. In contrast to CORT, adrenalectomy (ADX) caused elevations (50-125%) in hippocampus and cortex GFAP within 12 days of surgery that per-

sisted for at least 4 months. CORT replacement of ADX rats decreased GFAP amount in hippocampus and cortex. The effects of long-term CORT and ADX on GFAP in hippocampus and cortex were also seen in striatum, midbrain, and cerebellum, findings suggestive of brain-wide adrenal steroid regulation of the astrocyte protein. The changes in GFAP amount due to CORT and ADX were paralleled by changes in GFAP mRNA, indicating a possible transcriptional or at least genomic effect of adrenal steroids. (Copyright (c) 1991 International Society for Neurochemistry.)

Keywords: *Glucocorticoids, *Glial fibrillary acidic protein, *Adrenalectomy, Stains and staining, Rats, Hippocampus, Cerebral cortex, Steroids, Microtubule-associated proteins, Deoxyribonucleic acids, Radioimmunoassay, Trimethyltin, mRNA, Northern blotting, Immunohistochemistry, *Brain injuries, Reprints.

PB91-243048/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
Genotoxicity of 2-Amino-6-N-Hydroxyadenine (AHA) to Mouse Lymphoma and CHO Cells. Journal article.
Environmental Health Research and Testing, Inc., Research Triangle Park, NC.
M. M. Moore, K. Harrington-Brock, L. Parker, C. L. Doerr, and J. C. Hozier. c1991, 11p EPA/600/J-91/213
Contract EPA-68-02-4456
Pub. in Mutation Research, v253 p63-71 1991. Prepared in cooperation with Florida Inst. of Tech., Melbourne. Medical Genetics Lab. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.

2-Amino-6-N-hydroxyadenine (AHA) treated L5178Y/TK(+/-)-3.7.2C mouse lymphoma cells were evaluated for mutations at the tk, hgprt, and Na(1+)/K(1+) ATPase loci, as well as for gross chromosome aberrations and induction of micronuclei. In addition, AHA was evaluated for its ability to induce HGPRT mutants in CHO cells. AHA was found to induce mutations at all evaluated loci and in both cell types. The TK mutants were primarily large colonies although a few small colonies were also induced, particularly at the higher concentrations. Preliminary cytogenetic analysis of AHA-treated mouse lymphoma cells indicated that some gross aberrations but not micronuclei were induced. The 20 small-colony TK mutants evaluated by banded karyotype indicate that only a small fraction (2 of 20) showed chromosome 11 abnormalities. From these studies, it appears that AHA may be one of a very few chemicals that is capable of inducing multi-locus point mutations, with only slight clastogenic activity. Particularly at the higher concentrations, some of the mutants may contain multi-locus point mutations that result in slow growth. (Copyright (c) 1991 Elsevier Science Publishers B.V.)

Keywords: *Mutagens, *Lymphoma, Mutation, Mice, Chinese hamsters, Thymidine kinase, Chromosome aberrations, Micronucleus tests, Karyotyping, Hypoxanthine phosphoribosyltransferase, Ouabain, Chromosome mapping, Reprints, *Aminohydroxyadenines.

PB91-243055/REB PC **A02**/MF **A01**
Formation of Mutagenic Urinary Metabolites from 1-Nitropyrene in Germ-Free and Conventional Rats: Role of the Gut Flora. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
L. M. Ball, J. J. Rafter, J. A. Gustafsson, B. E. Gustafsson, and M. J. Kohan. c1991, 7p EPA/600/J-91/214
Pub. in Carcinogenesis, v12 n1 p1-5 1991. Prepared in cooperation with Karolinska Inst., Stockholm (Sweden).

1-Nitropyrene (NP), an environmental pollutant, a potent mutagen and an animal carcinogen, undergoes reduction, acetylation, ring-hydroxylation and conjugation in the rat in vivo to form mutagenic metabolities which are excreted in the urine. In order to investigate the role of the gut flora in the generation of these metabolities, germ-free rats of the AGUS strain, and conventional AGUS rats matched for sex and age, where injected intraperitoneally with NP labelled with (14)C. When urines were examined for mutagenicity with the Ames plate incorporation assay, the highest mutagenic activity was seen in 8-24 h urine from conventional rats in the presence of S9. These results indicate that the gut flora are necessarity involved in the formation of 6-hydroxy-1-acetamidopyrene, and their role may include both introreduction and the hydrolysis of glucuronides released from enterohepatic recirculation.

Keywords: *Mutagens, *Urine, *Intestines, Carcinogens, Mutagenicity tests, Rats, Spectrophotometry, Liquid chromatography, Environmental pollutants, Metabolic activation, Reprints, *Nitropyrenes, Hydroxyacetamidopyrene.

PB91-243386/REB PC **A07**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Development of Ozone Reactivity Scales for Volatile Organic Compounds.
California Univ., Riverside. Statewide Air Pollution Research Center.
W. P. L. Carter. Sep 91, 130p EPA/600/3-91/050
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Methods for developing a numerical scale ranking reactivities of volatile organic compounds (VOCs) towards ozone formation were investigated. Effects of small VOC additions on ozone formation (incremental reactivities) were calculated for 140 types of VOCs in model scenarios representing a variety of single-day pollution episodes. Relative reactivities determined from effects of the VOCs on maximum ozone concentrations (ozone yields) varied widely among the scenarios, but relative reactivities determined from effects on integrated ozone levels were less variable. A 'maximum reactivity' scale was derived from ozone yield reactivities in scenarios where NOx inputs were adjusted so the VOCs had the greatest effect on ozone, and a 'maximum ozone' scale was derived from scenarios where NOx inputs gave maximum ozone concentrations. These scales gave different relative reactivities for many VOCs, particularly aromatics. Several 'multi-scenario' scales were derived from the ozone yield and integrated ozone reactivities in the unadjusted scenarios. The maximum ozone scale was more consistent with averages of ratios of ozone yield reactivities, but the maximum reactivity scale was more consistent with ratios of integrated ozone reactivities and also corresponded best to multi-scenario scales developed to minimize the total error in ozone predictions. Information concerning effects of NOx levels, of the composition of base case VOC emissions, and of other scenario conditions on reactivities was also obtained.

Keywords: *Volatile organic compounds, *Chemical reactivity, *Ozone, *Air pollution, Nitrogen oxides, Mathematical models, *Ozone reactivity scales.

PB91-507236/REB CP **D03**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Fate and Treatability Estimator (FATE) Model (for Microcomputers). Model-Simulation.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
1991, 1 diskette EPA/SW/DK-92/002
System: IBM PC AT, XT; MS DOS 2.2+ operating system, 384K. Language: 'C'. Clipper compiled. Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
The software is on one 5 1/4 inch diskette, 1.6M double density. Documentation included; may be ordered separately as PB91-921269.

The model was developed to help users understand the fate and treatability of pollutants in wastewaters discharged to conventional activated sludge Publically Owned Treatment Works (POTWs). It aids the user in evaluating whether pollutants in an influent to a POTW are sorbed onto sludge, are volatilized off into the atmosphere, or are biodegraded. The software also will estimate the amount of the pollutant in each process end point of the model, as well as percent total removal from the wastewater influent stream. The FATE model has the capability to evaluate the treatability of both inorganic and organic pollutants discharged to a POTW. Since inorganic and organic compounds are removed by different physical and chemical processes in a POTW, FATE consists of separate models for organic fate analysis and inorganic fate analysis. The calibration and validation of the FATE model is based on actual plant data from a recent nation-wide survey of domestic POTWs. Plant performance data used in the calibration and validation was obtained from actual measurements of the influents and effluents of the surveyed POTWs. A detailed description of the uses and components of the FATE Model is included with the CERCLA Site Discharges to POTWs Treatability Manual.

Keywords: *Models-simulation, *Software, *Water pollution, *Industrial wastes, *Waste water, Diskettes, Sewage treatment, Inorganic compounds, Organic compounds, Physical treatment, Activated sludge processes, Calibrating, Sewage sludge, Air pollution, Biodeterioration, Concentration(Composition), *FATE Model, *Fate of pollutants, Fate and Treatability Estimator Model, Publically Owned Treatment Works, Chemical treatment.

PB91-507749/REB CP **D04**
Problem Principal Organic Hazardous Constituents (POHC) Reference Directory, (Version 1.0) (for Microcomputers). Data file.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Jan 91, 4 diskettes EPA/DF/DK-91/086
System: IBM XT and Compatible; DOS 2.0 and higher operating system, 640K.
The datafile is on four 360K, 5 1/4 inch diskettes, double density. File format: dBase III Plus. Documentation included; may be ordered separately as PB91-201061.

The hazardous waste incineration program is highly dependent on the regional permit writers and their knowledge of analytical methods for determining principal organic hazardous constituents (POHC's). Every trial burn plan must be approved by the regional permit writer. Because of the myriad of compounds that are proposed as test chemicals and because of the ever-changing status of analytical methodology for trace organic analysis, a tremendous burden is placed on the permit writer to stay abreast of the developments in the field. Currently there is no means to keep permit writers informed of advances in measurement technology. Measurement methods for many of the compounds, designated 'problem POHC's' are difficult to determine or cannot be determined at all with current technology. The purpose of the report was to assemble data on the Appendix VIII compounds relative to their analytical method status, physical properties and combustion properties. The objective is to provide regional hazardous waste permit writers with immediate access to these data to assist them in their review of trial burn sampling and analysis plans. The computer discs contain dBase III Plus compatible files containing the information described above and search controlling program instructions.

Keywords: *Data file, *Directories, *Hazardous materials, *Waste disposal, *Physicochemical properties, *Air pollution sampling, Incineration, Permits, Regional analysis, Diskettes, Combustion efficiency, Gas analysis, Ranking, Air pollution detection, Organic compounds, Data(Tables), *Principal organic hazardous constituents.

PB91-507756/REB CP **D03**
Protocol - A Computerized Solid Waste Quantity and Composition Estimation System (for Microcomputers). Software.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Sep 90, 1 diskette EPA/SW/DK-91/087
System: IBM; DOS 2.x or higher operating system, 256K. Language: FORTRAN. Documentation included in this package as PB91-201699. Documentation is not available separately.
The software is on one 360K, 5 1/4 inch diskette, double density.

The computer program is concerned with the design of sampling protocols and the analysis of data for the estimation of solid waste quantity and composition. It will: (1) Construct and add to a quantity data file; (2) Construct and add to a composition data file; (3) Analyze set of raw solid waste quantity data and make estimates of means and totals; (4) Analyze a set of composition data and make estimates of component means and totals; (5) Determine the sample sizes necessary to determine waste composition. The modules in the program will trap data-entry errors and illogical data, and a full-screen editor is also provided so that errors so detected can be corrected by the user without leaving the program.

Keywords: *Software, *Solid waste management, Volume, Study estimates, Diskettes, Sampling, Capacity, Chemical composition, Concentration(Composition), Materials handling, *PROTOCOL computer program.

PB91-507764/REB CP D03
Exposure Version 2: A Computer Model for Analyzing the Effects of Indoor Air Pollutant Sources (for Microcomputers). Software.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
4 Mar 91, 1 diskette EPA/SW/DK-91/088
System: Northgate 386; MS DOS 4.01 operating system. Language: Microsoft QuickBasic.
The software is on one 1.2M, 5 1/4 inch diskette, high density. Documentation included; may be ordered separately as PB91-201095.

Exposure, Version 2 is a model for calculating individual exposure to indoor air pollutants from indoor sources is presented. The model is designed to calculate exposure due to individual, as opposed to population, activity patterns, and source use. The model uses data on source emission, room-to-room air flows, air exchange, with the outdoors, and indoor sinks to predict concentration-time profiles for all rooms. The concentration-time profiles are then combined with individual activity patterns to estimate exposure. The model allows analysis of the effects of air cleaners located in with/or both the central air circulating system or individual rooms on IAQ and exposure. The model allows simulation of a wide range or source including long term steady state sources, on/off sources, and decaying sources. Several sources are allowed in each room. The model allows the analysis of the effects of sinks re-emissions on Indoor Air Quality (IAQ). The results of test house experiments are compared with model predictions. The agreement between predicted concentration-time profiles and the test house data is good. The disk contains both the executable EXE, files and source code files for the model. The files on the disk are in self extracting archives prepare using the public domain LHARC program.

Keywords: *Software, *Indoor air pollution, *Air pollution sources, *Computerized simulation, *Public health, *Air pollution effects(Humans), Diskettes, Exposure, Air flow, Concentration(Composition), Air quality, Mathematical models, Air pollution sampling, Houses, Residential buildings, Air cleaning systems, Comparison.

PB91-507871/REB CP D03
Indoor Air Quality Simulator for Personal Computers, (Version 1) (for Microcomputers). Model-Simulation.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Sep 90, 1 diskette EPA/SW/DK-91/092
System: IBM-PC; PC DOS 3.1 operating system. Supersedes PB89-133615.
The software is on one 1.2M, 5 1/4 inch diskette, high density. Documentation included; may be ordered separately as PB91-205153 (Technical Manual) and PB91-205161 (User's Guide).

IAQPC gives concentration profiles of up to 6 pollutants for up to 62 days in up to 20 rooms. The model includes the effects of building layout, sources, sinks, and the heating, ventilating, and air-conditioning system on pollutant concentration. The calculated results can be displayed as graphs on the screen. Full documentation is provided. The technical manual provides the theoretical background for the model, including details of the algorithms and the program source code listing. The user guide provides instruction on running the model and example runs. The disk contains the executable files for the indoor air quality model, IAQPC. IAQPC is designed for MS-DOS computers. The minimum hardware is an MS-DOS computer with DOS 2.0 or higher, 350 K of Memory and two floppy disk drive. A hard disk and EGA or better graphics card and color monitor are recommended.

Keywords: *Model-Simulation, *Software, *Indoor air pollution, *Air quality, *Air pollution sampling, Diskettes, Buildings, Pollution sources, Environmental engineering, Concentration(Composition), Personal computers, Ventilation, Heating systems, Air conditioning, Air pollution control, MS-DOS computers.

PB91-507889/REB CP D02
Crosswalk/Air Toxic Emission Factor Data Base Management System (Version 1.13) (for Microcomputers). Software.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Oct 90, 1 diskette EPA/SW/DK-91/093
System: IBM PC Compatible; PC DOS 3.0 or higher operating system, 20K. Language: Compiled dBase files. The software is on one 1.2M, 5 1/4 inch diskette, high density. Documentation included; may be ordered separately as PB91-205021.

Crosswalk/Air Toxic Emission Factor Data Base Management System (XATEF) presents a qualitative association of pollutants and sources or air pollutant/source 'crosswalk' and presents air toxic emission factors. More than 15,000 crosswalk associations are presented. More than 6,000 emission factors for 350 air toxics are presented. The following items are included: SIC code, SCC, pollutant name, CAS number, SIC description, SCC description, industrial process description, operating process description, notes about control and derivation of factors, and references.

Keywords: *Software, *Air pollution, *Emission factors, *Toxic substances, *Pollution sources, Information systems, Diskettes, Data base management, Industrial wastes, Operations, Air pollution control, Chemical compounds, Standard industrial classification, *XATEF system, Crosswalk/Air Toxic Emission Factor system, Source Category Code, Chemical nomenclature, Chemical Abstracts Service number.

PB91-508572/REB
see individual diskette(s) for order number and price
Toxic Release Inventory (TRI), United States and Territories (in dBase and Lotus 1-2-3 Format) (for Microcomputers). Data file.
Environmental Protection Agency, Washington, DC. Office of Toxic Substances.
1989,66 diskettes
Package contains 66 diskettes, PB91-508580 through PB91-509091 and PB91-509919. System: IBM PC or compatible. For use with DOS database management and spreadsheet programs. To use LOTUS-1-2-3 must have version 3.0 or higher. See also PB90-504069 and PB90-504051.
The data file is on 66 1.2M, 5 1/4 inch diskettes, high density. File format: ASCII, comma delimited. Documentation included; may be ordered separately as PB91-214023.

The Toxic Chemical Release Inventory (TRI) data on diskette includes (1) the names, addresses, counties, and public contacts of facilities manufacturing, processing or using the reported chemicals; (2) the SIC code for the plants; (3) the chemical involved; and (4) the estimated quantity emitted into the air (point and non-point emissions), discharged into bodies of water, injected underground, released to land, or released to publicly owned treatment works. All releases are in pounds per year. (Other individual documents are also available.)

United States and Territories (dBase and Lotus 1-2-3 Format). 1989, 66 diskettes DK $1800.00 **PB91-508572/REB**
Alabama (dBase and Lotus 1-2-3 Format). 1989, 1 diskette DK D01 **PB91-508580/REB**
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PB91-509109/REB
see individual diskette(s) for order number and price
Toxic Release Inventory (TRI), United States and Territories (in Macintosh Excel Format) (for Microcomputers). Data file.
Environmental Protection Agency, Washington, DC. Office of Toxic Substances.
1989,76 diskettes
Package contains 76 diskettes, PB91-509117 through PB91-509620 and PB91-509927. System: Apple Macintosh. For use with Macintosh database management and spreadsheet programs. See also PB90-504069 and PB90-504051.

The datafile is on 76 800K, 3 1/2 inch diskettes, double density. File format: ASCII, comma delimited. Documentation included; may be ordered separately as PB91-214023.

The Toxic Chemical Release Inventory (TRI) data on diskette includes (1) the names, addresses, counties, and public contacts of facilities manufacturing, processing or using the reported chemicals; (2) the SIC code for the plants; (3) the chemical involved; and (4) the estimated quantity emitted into the air (point and non-point emissions), discharged into bodies of water, injected underground, released to land, or released to publicly owned treatment works. All releases are in pounds per year.

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New Hampshire (Macintosh Excel Format). 1989, 1 diskette DK D01 **PB91-509398/REB**
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Oregon (Macintosh Excel Format). 1989, 1 diskette DK D01 **PB91-509471/REB**
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Puerto Rico (Macintosh Excel Format). 1989, 1 diskette DK D01 **PB91-509497/REB**
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Washington (Macintosh Excel Format). 1989, 1 diskette DK D01 **PB91-509596/REB**
West Virginia (Macintosh Excel Format). 1989, 1 diskette DK D01 **PB91-509604/REB**
Wisconsin (Macintosh Excel Format). 1989, 2 diskettes DK D01 **PB91-509612/REB**
Wyoming (Macintosh Excel Format). 1989, 1 diskette DK D01 **PB91-509620/REB**

PB91-509794/REB CP **D02**
REFEREE: Bibliographic Database Manager Version 4.2 (for Microcomputers). Model-Simulation.
Environmental Protection Agency, Research Triangle Park, NC. Environmental Criteria and Assessment Office.
4 Aug 87, 2 diskettes EPA/SW/DK-91/096
System: IBM-PC/XT/AT or compatible; MS-DOS 2.0 + operating system, 400K. Memory requirement - 490K RAM, 400K free disk space for software; data requires additional. Supersedes PB88-200779.
The software is on two 5 1/4 inch diskettes, 360K double density. File format: Clipper Microsoft C5.1 8086 as. The diskette(s) are in ASCII format. Documentation included; may be ordered separately as PB91-228791.

REFEREE is a general-purpose bibliographic database management program for IBM-compatible microcomputers. The program is ideal for maintenance of large, master databases from which lists of citations on desired topics frequently must be drawn. REFEREE databases exist as proprietary-format disk files. The program allows entry of information manually and automatically. Each record in a REFEREE database contains 9 fields. Seven of the fields are variable-length free-text fields that have essentially no format requirements; each can extend to nearly 6000 characters when necessary. All fields can be renamed to suit the user's needs. Up to 1 million records theoretically can be stored in a single REFEREE database: the actual maximum number depends on the amount of disk space available. Stored records can be viewed, modified, searched, sorted, printed, moved between REFEREE databases, and exported to dBASE.DBF files. By default, records are displayed and printed in a format that includes the names and contents of all 9 fields; the user may define custom formats.

Keywords: *Models-simulation, *Software, *Data base management, *Bibliographies, Libraries, File management systems, Records management, Utility routines, Format, Diskettes.

PB91-508572/REB
see individual diskette(s) for order number and price
Toxic Release Inventory (TRI), United States and Territories (in dBase and Lotus 1-2-3 format) (for Microcomputers). Data file.
Environmental Protection Agency, Washington, DC. Office of Toxic Substances.
1989,66 diskettes
System: IBM PC or compatible. For use with DOS database management and spreadsheet programs. To use Lotus 1-2-3 must have version 3.0 or higher. See also PB90-503020 and PB90-503566.
The datafile is on one 1.2M, 5 1/4 inch diskette, high density. File format: ASCII, comma delimited. Documentation included; may be ordered separately as PB91-214023.

The Toxic Chemical Release Inventory (TRI) data on diskette includes (1) the names, addresses, counties, and public contacts of facilities manufacturing, processing or using the reported chemicals; (2) the SIC code for the plants; (3) the chemical involved; and (4) the estimated quantity emitted into the air (point and non-point emissions), discharged into bodies of water, injected underground, released to land, or released to publicly owned treatment works. All releases are in pounds per year.

Connecticut (dBase and Lotus 1-2-3 Format). 1989, 1 diskette DK D01 **PB91-509919/REB**

PB91-509109/REB
see individual diskette(s) for order number and price
Toxic Release Inventory (TRI), United States and Territories (in Macintosh Excel Format) (for Microcomputers). Data file.
Environmental Protection Agency, Washington, DC. Office of Toxic Substances.
1989,76 diskettes
System: Apple Macintosh. For use with Macintosh database management and spreadsheet programs. See also PB90-503020 and PB90-503566.
The datafile is on one 800K, 3 1/2 inch diskette, double density. File format: ASCII, comma delimited. Documentation included; may be ordered separately as PB91-214023.

The Toxic Chemical Release Inventory (TRI) data on diskette includes (1) the names, addresses, counties, and public contacts of facilities manufacturing, processing or using the reported chemicals; (2) the SIC code for the plants; (3) the chemical involved; and (4) the estimated quantity emitted into the air (point and non-point emissions), discharged into bodies of water, injected underground, released to land, or released to publicly owned treatment works. All releases are in pounds per year.

Connecticut (Macintosh Excel Format). 1989, 1 diskette DK D01 **PB91-509927/REB**

PB91-509935/REB CP **D02**
Continuous Release - Emergency Response Notification System (for Microcomputers). Model-Simulation.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
16 May 91, 2 diskettes* EPA/SW/DK-91/097
System: IBM or IBM-compatible; MS DOS 3.0 or higher operating system, 512K. Language: Fortran/Clipper.
The software is on two 360K, 5 1/4 inch diskettes, double density. Documentation is on a diskette.

The Continuous Release - Emergency Response Notification System (CR-ERNS) is a user-friendly software system designed to assist facilities and vessels in complying with the continuous release reporting requirements of CERCLA Section 103 (f) (2). CR-ERNS is designed to allow users to report multiple releases of hazardous substances from multiple sources, and to generate both printed and electronic reports for submittal to the U.S. Environmental Protection Agency.

Keywords: *Models-Simulation, *Software, *Hazardous materials, *Risk assessment, *Environmental surveys, Diskettes, Data base management, Pollution sources, US EPA, Emergency planning, Notification procedures, *Continuous Release-Emergency Response Notification System, Comprehensive Environmental Response Compensation and Liability Act.

PB91-509992/REB CP **T05**
MOBILE4.1: Highway Vehicle Mobile Source Emission Factor Model Source Code. Model-Simulation.
Environmental Protection Agency, Ann Arbor, MI. Office of Mobile Sources.
Aug 91, mag tape EPA/SW/MT-91/098
System: Amdahl 5890-180E; Michigan Terminal System (MTS) operating system. Language: FORTRAN77. This program is in source code and is not machine specific. Supersedes PB89-170203. Other formats available as PB91-510008 (IBM PC AT, XT, or P/S 2) and PB91-510016 (Apple Macintosh Version).
Available in 9-track, EBCDIC character set, 1600 or 6250 bpi. For 6250 bpi, the price is T05. Documentation included; may be ordered separately as PB91-228759.

MOBILE4.1 is the latest revision to EPA's highway vehicle mobile source emission factor model. Relative to MOBILE4, it contains numerous revisions and provides the user with additional options for modeling highway vehicle emission factors. It will calculate emission factors for hydrocarbons (HC), carbon monoxide, (CO), and oxides of nitrogen (NOx) from highway

motor vehicles. It calculates emission factors for eight individual vehicle types, in two regions of the country (low and high altitude). The emission factors depend on various conditions such as ambient temperature, fuel volatility, speed, and mileage accrual rates. It will estimate emission factors for any calendar year between 1960 and 2020 inclusive. The 25 most recent model years are considered in operation in each calendar year. EPA is requiring that states and others preparing emission inventories for nonattainment areas for CO and ozone to use MOBILE4.1 in the development of the base year 1990 emission inventories required under the Clean Air Act of 1990.

Keywords: *Models-simulation, *Mobile pollutant sources, *Emission factors, *Exhuast emmissions, *Air pollution, *Software, Highway transportation, Hydrocarbons, Carbon monoxide, Nitrogen oxides, Magnetic tapes, Ozone, Revisions, State government, *MOBILE model, Mobile Source Emission Factor Model, Emission inventories, Clean Air Act of 1990.

PB91-510008/REB CP **D05**
MOBILE4.1: Highway Vehicle Mobile Source Emission Factor Model (IBM PC Compatible) (for Microcomputers). Model-Simulation.
Environmental Protection Agency, Ann Arbor, MI. Office of Mobile Sources.
Aug 91, 1 diskette EPA/SW/DK-91/099
System: IBM-PC XT, AT, or P/S2 compatibles; MS DOS 4.00 operating system, 530K. Language: FORTRAN77. Many of the files on this diskette are in compressed form. They must be decompressed to operate the program. Supersedes PB89-170211. Other formats available as PB91-509992 (tape) and PB91-510016 (Apple Macintosh version).
The software is on one, 5 1/4 inch diskette, 1.2M high density. File format: ASCII. Documentation included; may be ordered separately as PB91-228759.

MOBILE4.1 is the latest revision to EPA's highway vehicle mobile source emission factor model. Relative to MOBILE4, it contains numerous revisions and provides the user with additional options for modeling highway vehicle emission factors. It will calculate emission factors for hydrocarbons (HC), carbon monoxide, (CO), and oxides of nitrogen (NOx) from highway motor vehicles. It calculates emission factors for eight individual vehicle types, in two regions of the country (low and high altitude). The emission factors depend on various conditions such as ambient temperature, fuel volatility, speed, and mileage accrual rates. It will estimate emission factors for any calendar year between 1960 and 2020 inclusive. The 25 most recent model years are considered in operation in each calendar year. EPA is requiring that states and others preparing emission inventories for nonattainment areas for CO and ozone to use MOBILE4.1 in the development of the base year 1990 emission inventories required under the Clean Air Act of 1990.

Keywords: *Models-simulation, *Software, *Emission factors, *Mobile pollutant sources, *Air pollution, *Exhaust emissions, Highway transportation, Hydrocarbons, Nitrogen oxides, Carbon monoxide, Diskettes, Revisions, State government, *MOBILE model, Mobile Source Emission Factor Model, Emission inventories, Clean Air Act of 1990.

PB91-510016/REB CP **D05**
MOBILE4.1: Highway Vehicle Mobile Source Emission Factor Model (Apple Macintosh Version) (for Microcomputers). Model-Simulation.
Environmental Protection Agency, Ann Arbor, MI. Office of Mobile Sources.
Aug 91, 1 diskette EPA/SW/DK-91/100
System: Apple Macintosh; Apple DOS 6.0.2 operating system, 1000K. Language: FORTRAN77. Many of the files on this diskette are in compressed form. They must be decompressed to operate the program. Other formats available as PB91-509992 (tape) and PB91-510008 (IBM PC XT, AT, P/S 2).
The software is on one, 3 1/2 inch diskette, 800K double density. File format: ASCII. Documentation included; may be ordered separately as PB91-228759.

MOBILE4.1 is the latest revision to EPA's highway vehicle mobile source emission factor model. Relative to MOBILE4, it contains numerous revisions and provides the user with additional options for modeling highway vehicle emission factors. it will calculate emission factors for hydrocarbons (HC), carbon monoxide, (CO), and oxides of nitrogen (NOx) from highway motor vehicles. It calculates emission factors for eight individual vehicle types, in two regions of the country (low and high altitude). The emission factors depend on various conditions such as ambient temperature, fuel volatility, speed, and mileage accrual rates. It will estimate emission factors for any calendar year between 1960 and 2020 inclusive. The 25 most recent model years are considered in operation in each calendar year. EPA is requiring that states and others preparing emission inventories for nonattainment areas for CO and ozone to use MOBILE4.1 in the development of the base year 1990 emission inventories required under the Clean Air Act of 1990.

Keywords: *Models-simulation, *Software, *Mobile pollutant sources, *Emission factors, *Exhaust emissions, *Air pollution, Diskettes, Highway transportation, US EPA, Hydrocarbons, Carbon monoxide, Nitrogen oxides, Revisions, State government, *MOBILE model, Mobile Source Emission Factor Model, Emission inventories, Clean Air Act of 1990, APPLE MACINTOSH system.

PB91-510024/REB CP **T05**
Toxic Substances Control Act (TSCA) Chemical Substances Inventory: Revised Inventory Synonym and Preferred Name File, June 1991. Data file.
Environmental Protection Agency, Washington, DC.
28 Jun 91, mag tape* EPA/DF/MT-91/101
System: IBM 3090 400E; MVS/ESA Sp3.1.OE operating system. File format: EBCDIC. Supersedes PB91-507301. See also PB86-220795 and PB86-220803.
Available in 9-track, EBCDIC character set, 1600 or 6250 bpi. For 6250 bpi, the price is T05. Documentation included; may be ordered separately as PB91-167767.

The computer tape contains the Inventory Synonym Name File and the Inventory Preferred Name File of the Toxic Substances Control Act (TSCA) Toxic Substance Inventory. These files reflect the 60,719 substances on the non-confidential Inventory file as of June 28, 1991. The EPA 'N' flag, which indicates a polymeric substance containing no free-radical initiator in its Inventory name, but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used, appears on these tapes for the appropriate polymers that were included in the 1990 Supplement. The tapes do not include this flag for polymers that were listed in the 1985 Edition. A review of the statistics for the amounts of CBI and non-CBI records on the source file and the file that produced these tapes, as well as the types of data elements selected, confirms that no TSCA CBI data are on the tapes.

Keywords: *Data file, *Environmental surveys, *Chemical compounds, Magnetic tapes, Free radicals, Polymers, Revisions, *Toxic Substances Control Act, *Chemical Substance Inventory, CAS Registry Number, Chemical nomenclature.

PB91-591330/REB CP **D99**
Integrated Risk Information System (IRIS), (Volume 4, Issue 3) (for Microcomputers). Data file.
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.
Jul 91, 9 diskettes
System: IBM-PC/AT. Supersedes PB90-591330.
Available on Standing Order, deposit account required. Price based on number of issues. Approximate annual cost for U.S., Canada, and Mexico $520; price for all others $1040. Also available individually; order number PB91-591331, price D03. The datafile is contained on nine (9) 1.2M, 5 1/4 inch diskettes, high density. File format: ASCII.

The Integrated Risk Information System (IRIS) provides information on how chemicals affect human health and is a primary source of Environmental Protection Agency (EPA) risk assessment information on chemicals of environmental concern. It serves as a guide for the hazard identification and dose-response assessment steps of EPA risk assessments. IRIS makes chemical-specific risk information readily available to those who must perform risk assessments and also increases consistency in risk management decisions. The principal section of IRIS is the chemical files. The chemical files contain: oral reference doses (RfD) and inhalation reference concentrations (RfC) for noncarcinogens; oral and inhalation carcinogen assessments; summarized Drinking Water Health Advisories; summaries of selected EPA regulations; supplementary data; and full bibliographic citations. The primary types of health assessment information in IRIS are oral RfDs, inhalation RfCs and carcinogen assessments. There are currently over 450 chemicals in IRIS.

Keywords: *Data file, *Chemicals, *Health risks, *Environmental effects, Risk assessments, Health status indicators, Permissible dosage, Toxic tolerances, Carcinogens, Inhalation, Regulations, Information systems, Diskettes, Potable water, Environmental Protection Agency.

PB91-921265/REB PC **A10/MF A03**
Guidance on Preparing Superfund Decision Documents: The Proposed Plan, The Record of Decision, Explanation of Significant Differences, The Record of Decision Amendment. Interim rept. (Final).
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jul 89, 223p* EPA/540/G-89/007
Package contains 5 parts: Base Document EPA/540/G-89/007 plus 4 Fact Sheets: PB90-273848, PB90-273855, PB91-921350, and PB91-921351.
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The guidance was developed to: (1) present standard formats for documenting Superfund remedial action decisions; (2) clarify the roles and responsibilities of EPA, States, and other Federal agencies in developing and issuing decision documents; and (3) explain how to address changes made to proposed and selected remedies. The decision documents addressed by the guidance are the Proposed Plan, the Record of Decision, the Explanation of Significant Differences, and the ROD amendment. The document has four (4) fact sheets attached which supplement the document. They are as follows: A Guide to Developing Superfund Records of Decision; A Guide to Developing Superfund Proposed Plans; A Guide to Developing Superfund No Action, Interim Action, and Contingency Remedy RODs; and A Guide to Addressing Pre-ROD and Post-ROD Changes.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Decision making, Remedial action, Guidelines, US EPA, Federal agencies, State government, Revisions, Substitutes, Management planning, Contingency planning, *Office of Solid Waste and Emergency Response, Record of Decision, Explanation of Significant Differences, Preremedial actions.

PB91-921268/REB PC **A05/MF A01**
Catalog of Office of Waste Programs Enforcement Publications.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 90, 88p* EPA/540/8-90/016
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The Catalog presents a list of key publications produced by the U.S. Environmental Protection Agency (EPA). The listed publications are agency guidance documents and directives produced by the Office of Waste Programs Enforcement (OWPE) for use by EPA Headquarters and Regional staff. OWPE, a division of the Office of Solid Waste and Emergency Response (OSWER), manages the program that seeks responsible party involvement and pursues cost recovery for Federal response actions. The publications in the Catalog are intended to assist implementation of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and the Resource Recovery and Conservation Act (RCRA). OWPE supports the implementation of CERCLA and RCRA enforcement programs by developing program strategies, formulating budgets, providing written guidance materials, and overseeing the progress of the RCRA and CERCLA programs in the Regions. Each entry in the Catalog includes an abstract or description of the content of the document, and indicates the document distributor. Separate indices are provided in the Catalog to enable the user to locate documents by title, subject, or document number. Order forms and complete instructions for obtaining documents are included.

Keywords: *Superfund, *Pollution regulations, *Catalogs(Publications), *Waste management, US

EPA, Guidelines, Abstracts, Law enforcement, Remedial action, Cost repayment, Notice of probable violation, Notification procedures, Listings, *Office of Waste Programs Enforcement, Office of Solid Waste and Emergency Response, Comprehensive Environmental Response Compensation and Liability Act, Resource Recovery and Conservation Act, Potentially responsible parties.

PB91-921269/REB PC **A99**/MF **A04**
CERCLA Site Discharges to POTWS Treatability Manual.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Aug 90, 631p EPA/540/2-90/007, EPA/9330.2-11
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The CERCLA Site Discharges to POTWs Treatability Manual was prepared for the U.S. EPA under Contract No. 68-03-3412. The manual is a compilation of mostly technical information a treatability data obtained in a study conducted by the Office of Water Regulations and Standards Industrial Technology Division (OWRS-ITD) on Comprehensive Environmental Response, Compensation, and Liability Act CERCLA wastewater discharges to POTWs. The information is provided to aid in the evaluation of the feasibility of discharging wastes from CERCLA sites to publicly owned treatment works (POTWs).

Keywords: *Superfund, *Waste management, *Hazardous materials, *Manuals, Feasibility studies, Technology utilization, Information transfer, Sewage treatment, Data processing, Performance standards, Sampling, Site surveys, Toxic substances, Aerobic processes, Mathematical models, *Office of Solid Waste and Emergency Response, *Publicly Owned Treatment Works, Pretreatment process.

PB91-921270/REB PC **A12**/MF **A02**
CERCLA Site Discharges to POTWS CERCLA Site Sampling Program: Detailed Data Report.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Aug 90, 251p EPA/540/2-90/008, EPA/9330.2-12
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The document contains wastewater data obtained from sampling at seventeen CERCLA sites during a study of wastewater discharges from CERCLA sites to publicly owned treatment works (POTWs). The document serves as an appendix to the report summarizing the findings of the CERCLA site sampling program in Section 3 (CERCLA Site Data Report) in the USEPA CERCLA Site Discharges to POTWs Treatability Manual.

Keywords: *Superfund, *Waste management, *Hazardous materials, Sampling, Site surveys, Sewage treatment, Data processing, *Office of Solid Waste and Emergency Response, *Publicly Owned Treatment Works.

PB91-921271/REB PC **A03**/MF **A01**
Compendium of ERT Toxicity Testing Procedures. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jan 91, 49p OSWER-9360.4-08
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The compendium documents the procedure for conducting a standard reference toxicity test using sodium pentachlorophenate (NaPCP) as the toxicant and larval Pimephales promelas (fathead minnows) as the test organism. The test estimates the fitness, condition, and sensitivity of the organisms used in a definitive toxicity test. It allows for inter- and intralaboratory comparisons of toxicity information and provides an experimental control.

Keywords: *Tests, *Hazardous materials, *Toxicity, Standards, Estimates, Sensivity, Laboratories, Microorganisms, Comparison, *Superfund, Pentachlorophenate.

PB91-921272/REB PC **A18**/MF **A04**
Superfund Program Management Manual, Fiscal Year 1992. Volume 1 and Volume 2. Directive (Final).
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jun 91, 412p OSWER-9200.3-01F
See also PB90-273707.
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

Illustrates the relationships among the major Superfund management tools including identifying program goals and priorities, translating priorities into targets and measures that are planned and tracked through the Superfund Comprehensive Accomplishments Plan (SCAP), allocating resources through targets and measures, and evaluating SCAP to determine whether program goals are being met.

Keywords: *Hazardous materials, *Manuals, *Project management, Management planning, Decision making, Budgeting, Financial management, *Superfund, Waste management, *Office of Solid Waste and Emergency Response, Comprehensive planning.

PB91-921273/REB PC **A03**/MF **A01**
Compendium of ERT Soil Sampling and Surface Geophysics Procedures. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jan 91, 43p OSWER-9360.4-02
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The compendium of soil sampling and surface geophysics procedures describes methods used for preventing or reducing cross-contamination, and provides general guidelines for sampling equipment decontamination procedures at hazardous waste site. Preventing or minimizing cross-contamination in sampled media and in samples is important for preventing the introduction of eror into sampling results and for protecting the health and safety of site personnel.

Keywords: *Sampling, *Soils, *Hazardous materials, Equipment, Neutralization, Removal, Sterilization, Disinfection, Cleaning, *Superfund.

PB91-921274/REB PC **A03**/MF **A01**
Compendium of ERT Surface Water and Sediment Sampling Procedures. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jan 91, 30p OSWER-9360.4-03
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The Standard Operating Procedure (SOP) describes methods used for preventing or reducing cross-contamination, and provides general guidelines for sampling equipment decontamination procedures at a hazardous waste site. Preventing or minimizing cross-contamination in sampled media and in samples is important for preventing the introduction of error into sampling results and for protecting the health and safety of site personnel.

Keywords: *Hazardous materials, *Surface waters, *Sediments, Equipment, Sampling, Decontamination, Prevention, Public health, Personnel, *Superfund.

PB91-921275/REB PC **A04**/MF **A01**
Compendium of ERT Groundwater Sampling Procedures. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jan 91, 69p OSWER-9360.4-06
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The Compendium of Groundwater Sampling Procedures describes methods used for preventing or reducing cross-contamination, and provides general guidelines for sampling equipment decontamination procedures at a hazardous waste site. Preventing or minimizing cross-contamination in sampled media and in samples is important for preventing the introduction of error into sampling results and for protecting the health and safety of site personnel.

Keywords: *Ground water, *Hazardous materials, *Waste disposal, Sampling, Instructions, Contamination, Prevention, Sites, Public health, Personnel, *Superfund.

PB91-921276/REB PC **A04**/MF **A01**
Compendium of ERT Waste Sampling Procedures. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jan 91, 58p OSWER-9360.4-07
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The compendium of waste sampling procedures describes methods used for preventing or reducing cross-contamination, and provides general guidelines for sampling equipment decontamination procedures at a hazardous waste site. Preventing or minimizing cross-contamination in sampled media and in samples is important for preventing the introduction of error into sampling results and for protecting the health and safety of site personnel.

Keywords: *Hazardous materials, *Waste disposal, Sampling, Contamination, Response, Sites, Prevention, Public health, Safety, *Superfund.

PB91-921277/REB PC **A24**/MF **A04**
ROD Annual Report, FY 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jul 91, 557p OSWER-9355.6-04
See also PB90-258484.
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report presents the Regional and Headquarters staff with summary data on RODs. The report features specific accomplishments in the ROD process and summarizes the year's RODs by describing site conditions and key contaminants, selected remedial actions, specific remedy performance standards and goals, and institutional controls.

Keywords: *Groundwater, *Hazardous materials, *Waste disposal, Sites, Contaminants, Performance evaluation, Standards, Pollution control, *Superfund, Record of Decision, Remedial action.

PB91-921278/REB PC **A04**/MF **A01**
User's Guide to the Contract Laboratory Program.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jan 91, 75p EPA/540/P-91/002, OSWER-9240.0-01D
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report describes an organic and inorganic analytical program and outlines Contract Laboratory Program (CLP) protocols. Contains critical information for CLP samplers and user groups in EPA and the states.

Keywords: *Hazardous materials, *Laboratories, Contracts, Project planning, Instructions, Requirements, *Superfund, Users guide, Protocol.

PB91-921279/REB PC **A04**/MF **A01**
National On Scene Coordinator Directory.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Sep 91, 69p* OERR-9200.0-08
Supersedes PB90-249509.
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada,

and Mexico; all others $400). Single copies also available in paper copy or microfiche.

Developed as a handy reference guide to simplify communications and to promote the transfer of technical expertise among On-Scene Coordinators (OSCs). In addition to names and telephone numbers of OSCs, the directory contains Regional and Headquarters addresses, facsimile and E-mail numbers; TAT, ERCS, ERNS and prerardedness contacts; and a telephone information hotline listing. The directory also contains a comprehensive 'speciality area' index that can be a useful reference for contacting OSCs or others who have extensive experience in a particular response situation or specialized area.

Keywords: *Directories, *Coordinated procurement, *Personnel, Air pollution, Water pollution, Waste disposal, Radioactive materials, Hazardous materials, *Superfund, Emergency plans, Waste management, Regional analysis, Federal assistance programs.

PB91-921280/REB PC **A03**/MF **A01**
Compendium of Federal Facilities Directives, 1984 and 1985. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Aug 91, 13p OSWER-9272.0-06
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The compendium is a collection of Federal Facilities directives issued in 1984 and 1985. The contents includes: Federal Facilities (9272.0-04); Implementation of CERCLA Strategy at Federal Facilities (9272.0-01); Initial Guidance on Federal Facilities CERCLA Sites (9272.0-02); Responsibilities for Federal Facilities (9272.0-03); and Responsibilities for Federal Facilities (9272.0-05).

Keywords: *Federal government, *Facilities, Hazardous materials, Manuals, Government agencies, Project planning, Responses, Government policies, *Superfund, Directives.

PB91-921281/REB PC **A04**/MF **A01**
Compendium of NPL Listing Policies and Procedures, 1982 to 1985. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Aug 91, 74p OSWER-9320.1-10
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The compendium is a collection of NPL listing policy and procedure directives issued from 1982 to 1985. The contents include: Guidance for Establishing the National Priorities List, February 1982 (9320.1-01); Guidance for Establishing the National Priorities List, June 1982 (9320.1-02); Guidance for Proposed NPL Update No. 3, February 1984 (9320.3-04); Guidance for Updating the National Priorities List, May 1983 (9320.3-01); Instructions for Promulgating the National Priorities List Update, January 1984 (9320.3-02); National Priorities List Categorization, July 1984 (9320.1-04); NPL Information Update - Update No. 4, April 1985 (9320.3-05); Procedures for Updating the National Priorities List, May 1984, (9320.3-03); Promulgation of the National Priorities List, May 1983 (9320.1-03); RCRA/NPL Listing Policy, September 1986 (9320.1-05); and Updating the National Priorities List: Update No. 6 Proposal, September 1985 (9320.3-06).

Keywords: *Hazardous materials, *Waste disposal, Instructions, Government policies, National government, *Superfund, National Priorities list, Listings, Directives.

PB91-921282/REB PC **A04**/MF **A01**
Oil Spill Contingency Planning: National Status. A Report to the President.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 90, 69p OSWER-9360.8-05
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

In response to the Exxon Valdez oil disaster, President Bush directed the National Response Team (NRT) to take a fresh look at America's readiness to respond to oil spills of national significance in the countries' major ports and inland waterways. The report was done in a compressed timeframe to provide a representative picture of oil spill planning and preparedness across the country. To accomplish this task, the United States Coast Guard and the United States Environmental Protection Agency provided a leadership role for the NRT which directed federal, regional, and local offices to evaluate the effectiveness of their oil spill contingency plans. The report represents the combined efforts of hundreds of individuals, including Coast Guard and EPA On-Scene Coordinators.

Keywords: *Oil pollution, *Pollution control, Response, Project planning, Emergencies, Surveys, Coast Guard, Effectiveness, *Superfund, Oil spills, Exxon Valdez Oil Spill, US EPA.

PB91-921283/REB PC **A11**/MF **A03**
Survey of Materials-Handling Technologies Used at Hazardous Waste Sites.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jun 91, 226p EPA/540/2-91/010, OSWER-9380.1-13
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The study summarizes the types of debris, material, and contaminants found at Superfund and other hazardous waste sites and the materials-handling equipment and general procedures used to perform site restoration and cleanup. The report provides the U.S. Environmental Protection Agency (EPA) with information on state-of-the-art materials-handling equipment and procedures useful for addressing difficult, site-specific, materials-handling problems.

Keywords: *Hazardous materials, *Materials handling, *Site surveys, *Technology utilization, Case studies, Remedial action, Superfund, Information transfer, Equipment, Procedures, Cleanup operations, US EPA Regions 1-10.

PB91-921284/REB PC **A07**/MF **A02**
Synopses of Federal Demonstrations of Innovative Site Remediation Technologies.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
May 91, 133p EPA/540/8-91/009, OSWER-9380.1-06
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

A compendium of abstracts documenting the results of demonstrations of hazardous treatment technologies conducted by Federal agencies involved in Superfund Remediation and RCRA and UST Corrective Actions. The document contains abstracts from EPA (primarily from the Superfund Innovative Technology Evaluation program), DOD, and DOE. It also includes an outline of data needs to guide project managers in submitting information on new projects for future editions of the document.

Keywords: *Hazardous materials, *Pollution control, Sites, Government agencies, National government, Abstracts, Project management, *Superfund, Remedial action, Innovative technology.

PB91-921285/REB PC **A04**/MF **A01**
Technical Support Services for Superfund Site Remediation. Second Edition.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 90, 73p EPA/540/8-90/011, OSWER-9380.1-14
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The Directory (Second Edition) updates and highlights the significant OSWER and ORD technical assistance programs that have procedures in place to process requests such as answering a technical question, providing staff to work on a problem, or referring callers to the appropriate source.

Keywords: *Sites, *Hazardous materials, *Solid waste disposal, Directories, Technical assistance, Project planning, Monitoring, Ground water, *Superfund, Remedial action.

PB91-921287/REB PC **A03**/MF **A01**
Continuous Release - Emergency Response Notification System. User's Manual for Industry. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Mar 91, 36p EPA/540/G-91/005, OSWER-9360.7-02
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report announces the availability of the Agency's 'Continuous Release-Emergency Response Notification System: User's manual for Industry' and the accompanying diskette. The diskette contains the Continuous Release-Emergency Response Notification System (CR-ERNS). The purpose of the User's Manual is to assist industry in reporting continuous releases of hazardous substances using CR-ERNS.

Keywords: *Hazardous materials, *Waste disposal, Users manuals(Computers), Sites, Industries, Response, Requirements, *Superfund, Notification.

PB91-921288/REB PC **A03**/MF **A01**
Accessing Federal Data Bases for Contaminated Site Clean-Up Technologies.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
May 91, 29p EPA/540/8-91/008, OSWER-9380.1-07
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The document is a reference tool that provides information on those systems maintaining data on remedial technologies. It may be used by Project Managers as a pointer to repositories of technical information, or as a source of contacts that may be useful to future system design. Each data base profile contains information on specific data elements, system uses, hardware and software requirements, and access. The profiles also include Agency contacts for each system should more detailed information be required.

Keywords: *Sites, *Hazardous materials, *Data aquisition, *Pollution control, National government, Data bases, Contamination, *Superfund, Cleanup, Remedial action.

PB91-921289/REB PC **A03**/MF **A01**
Vendor Information Form to be Completed for Participation in the: Vendor Information System for Innovative Treatment Technologies (VISITT).
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jun 91, 48p EPA/540/2-91/011, OSWER-9380.1-12
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The Vendor Information System for Innovative Treatment Technologies (VISITT) is an automated database developed for use by those responsible for site remediation, including state, federal, and private sector professionals responsible for site cleanup of the nation's hazardous waste sites. The Technology Innovation Office (TIO) and the Office of Solid Waste and Emergency Response (OSWER) is conducting the Invitation for Submittals for developers and providers of innovative treatment technologies. The information submitted will be entered into the database. EPA expects that VISITT will be used as a tool to screen technologies for remediation of these sites.

Keywords: *Hazardous materials, *Waste treatment, Vendors, Data bases, Screening, Investments, *Superfund, Innovative technology, Clean up, Remedial action.

PB91-921290/REB PC **A03**/MF **A01**
Innovative Treatment Technologies: Semi-Annual Status Report, January 1991. First Issue.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jan 91, 30p EPA/540/2-91/001, OSWER-9380.0-19
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The document was developed to provide information on specific sites that have selected or used innovative treatment technologies. The information serves several purposes: (1) to track the progress of innovative technology use; (2) to provide market information to technology vendors; and (3) to facilitate communication among innovative technology users.

Keywords: *Hazardous materials, *Waste treatment, Sites, Utilization, Vendors, Market research, Communicating, *Superfund, Innovative technology, Clean up.

PB91-921291/REB PC **A03**/MF **A01**
Superfund Engineering Issue: Treatment of Lead-Contaminated Soils.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 11p EPA/540/2-91/009, OSWER-9380.7/03A
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The bulletin summarizes the contents of a seminar on treatment of lead-contaminated soils presented on Aug. 28, 1990, to Region V Superfund and RCRA personnel by members of EPA's Engineering and Treatment Technology Support Center located in the Risk Reduction Engineering Laboratory (RREL) in Cincinnati, Ohio. The bulletin is intended to summarize the information presented during the seminar and it should not be viewed as a definitive treatise on lead treatment technologies.

Keywords: *Lead(Metal), *Hazardous materials, *Waste treatment, *Meetings, Soils, Technical assistance, Response, Regional analysis, Extraction, Leaching, Washing, Risk, *Superfund.

PB91-921292/REB PC **A03**/MF **A01**
Subsurface Contamination Reference Guide.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 90, 26p EPA/540/2-90/011
Package includes three parts: Reference Guide; Reference Tables 1 and 2 (EPA/540/2-90/011A); Reference Table 3 (EPA/540/2-90/011B).
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The guide was developed to provide a source of information pertaining to important fate and transport properties for a variety of contaminants commonly found in ground water at Superfund sites. The information may help to focus site investigation efforts and identify early-on potential remediation strategies. Information pertaining to contaminat fate and transport properties have been presented in tabular form and provided as separately published charts for easy reference.

Keywords: *Ground water, *Hazardous materials, Environmental transport, Sites, Identifying, Tables(Data), Graphs(Charts), *Superfund, Remedial action.

PB91-921293/REB PC **A03**/MF **A01**
Bibliography of Federal Reports and Publications Describing Alternative and Innovative Treatment Technologies for Corrective Action and Site Remediation.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
May 91, 29p EPA/540/8-91/007, OSWER-9380.1-08
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The Federal Remediation Technologies Roundtable developed this bibliography to publicize the accessibility of Federal documents pertaining to innovative and alternative technologies to treat hazardous wastes. The bibliography contains references for documents and reports from the U.S. Environmental Protection Agency (EPA), the U.S. Army, the U.S. Army Corps of Engineers, the U.S. Navy, the U.S. Air Force, the U.S. Department of Energy (DOE), and the U.S. Department of Interior (DOI), Bureau of Reclamation. The publication contains references and order information for reports on research concerning the application of innovative and alternative hazardous waste treatment options. The bibliography is scheduled to undergo periodic revisions.

Keywords: *Sites, *Hazardous materials, *Research management, *Bibliographies, Technical reports, Waste treatment, Research program administration, National government, Federal agencies, Remedial action, Innovative technology, Alternative planning.

PB91-921294/REB PC **A03**/MF **A01**
Ground-Water Issue: Characterizing Soils for Hazardous Waste Site Assessments.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
R. P. Breckenridge, J. R. Williams, and J. F. Keck. Mar 91, 17p EPA/540/4-91/003
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The Regional Superfund Ground Water Forum is a group of ground-water scientists representing EPA's Regional Offices, organized to exchange up-to-date information related to ground-water remediation at hazardous waste sites. Soil characterization at hazardous waste sites is an issue identified by the forum as a concern of CERCLA decision-makers. Soil characterization provides data types required for decision making in three distinct RI/FS tasks: (1) Determination of the nature and extent of soil contamination. (2) Risk assessment, and determination of risk-based soil cleanup levels. (3) Determination of the potential effectiveness of soil remediation alternatives.

Keywords: *Ground water, *Soil classification, *Hazardous materials, Sites, Assessments, Contamination, Risk, Environmental transport, Cost effectiveness, Soil texture, Permeability, Mathematical models, *Superfund, Remedial action.

PB91-921332/REB PC **A01**/MF **A01**
Applicability of Land Disposal Restrictions to RCRA and CERCLA Ground Water Treatment Reinjection Superfund Management Review: Recommendation No. 26. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Dec 89, 5p OSWER-9234.1-06
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The directive discusses whether or not ground water contaminated with restricted RCRA hazardous wastes, which is extracted during RCRA corrective action or CERCLA response action must meet the best demonstrated available technology (BDAT) identified for that waste under the RCRA land disposal restrictions (LDRs) prior to each reinjection. The directive explains EPA's interpretation of whether the LDRs are applicable or (under CERCLA response actions only) relevant and appropriate to such reinjections or to the remediation as a whole.

Keywords: *Superfund, *Waste management, *Hazardous materials, Ground disposal, Waste disposal, Pollution regulations, Ground water, Water pollution control, Best technology, Remedial action, Performance standards, Injection wells, *Office of Solid Waste and Emergency Response, *Land Disposal Restrictions, Management reviews, Resource Conservation and Recovery Act.

PB91-921333/REB PC **A01**/MF **A01**
Total Quality Management (TQM) and Quality Assurance (QA) in Superfund. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
5 Dec 90, 4p OSWER-9242.6-08
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The directive discusses the support of Total Quality Management and Quality Assurance by the Director of the Office of Emergency and Remedial Response. It focuses especially on TQM as it relates to Superfund's QA Program and the development of Data Quality Objective (DQOs) for the RI/FS and RD/RA processes.

Keywords: *Superfund, *Waste management, *Hazardous materials, Remedial action, Feasibility studies, Quality assurance, Data quality, Decision making, *Office of Solid Waste and Emergency Response.

PB91-921334/REB PC **A02**/MF **A01**
Regional Site Assessment Program Objectives for FY 90. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
5 Jan 90, 10p OSWER-9345.2-03
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The directive updates earlier OSWER Directives 9345.2-02 and 9345.2-01. It is recommended that the reader review the formerly published directives since all policies of those documents remain in effect unless otherwise changed by this document. The document contains OERR site assessment objectives for EPA Regions during FY 90. The overall goal of Regional pre-remedial activity remains the identification of the most serious hazardous waste release sites in the nation and evaluating them for the National Priorities List (NPL). The document specifically lists the eight (8) Regional objectives for FY 90.

Keywords: *Superfund, *Waste management, *Hazardous materials, Revisions, Site surveys, Regional analysis, Implementation, Ranking, Guidelines, *Office of Solid Waste and Emergency Response, Preremedial actions, National Priorities List.

PB91-921335/REB PC **A03**/MF **A01**
Headquarters Support Contract Management Procedures. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
15 Nov 89, 23p OSWER-9242.6-05
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The directive addresses two areas: (1) perceptions that may weaken public confidence in the Superfund program and its use of these contracts; and (2) procedures designed to strengthen controls and effectiveness in the management of the contracts. It is not all inclusive but provides information to be applied to OERR work assignments.

Keywords: *Superfund, *Waste management, *Hazardous materials, Contracts, Management planning, Administrative procedures, Quality control, Information transfer, Work measurement, *Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response.

PB91-921336/REB PC **A03**/MF **A01**
Furthering the Use of Innovative Treatment Technologies in OSWER Programs. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
10 Jun 91, 22p OSWER-9380.0-17
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Office of Solid Waste and Emergency Response (OSWER), in this directive, is seeking to further the use of innovative treatment technologies in order to (1) better pursue its statutory and regulatory mandates to promote treatment to the maximum extent practicable; (2) speed the availability of performance data regarding newly developed treatment technologies to many constituencies facing mandates to clean contaminated sites; (3) broaden the inventory of accepted treatment-based solutions; and (4) increase the likelihood the re-

mediation costs can be lowered in the near term through the demonstration of a larger number of engineering options to solve site remediation problems.

Keywords: *Superfund, *Waste management, *Waste treatment, *Hazardous materials, Pollution regulations, Technology utilization, Performance evaluation, Remedial action, Soil contamination, Cost analysis, Environmental engineering, *Office of Solid Waste and Emergency Response, Cleanup operations.

PB91-921338/REB PC **A02/MF A01**
Hazardous Waste Operations and Emergency Response: General Information and Comparison. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 10p OSWER-9285.2-09FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The purpose of the Fact Sheet is to explain the scope and purpose of the worker protection standards issued under SARA Title I, and to distinguish these standards from other regulations and consensus standards covering the same or similar subject matter.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Occupational safety and health, Operations, Standards, Regulations, Emergency plans, History, Occupational exposure, US EPA, US OSHA, Requirements, Medical records, Comparison, *Office of Solid Waste and Emergency Response, Cleanup operations, Cooperative agreements.

PB91-921339/REB PC **A03/MF A01**
Hazardous Waste Operations and Emergency Response: Uncontrolled Hazardous Waste Sites and RCRA Corrective Actions. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 16p OSWER-9285.2-08FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The purpose of the Fact Sheet is to explain the principle requirements of the EPA and OSHA worker protection standards as they apply to employees engaged in hazardous waste operations at uncontrolled hazardous waste sites, including employees who perform corrective actions at RCRA TSD facilities.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Occupational safety and health, Site surveys, Operations, Pollution regulations, Personnel development, Occupational exposure, Remedial action, Requirements, Medical records, Training, *Office of Solid Waste and Emergency Response, Resource Conservation and Recovery Act, Cleanup operations.

PB91-921340/REB PC **A03/MF A01**
Hazardous Waste Operations and Emergency Response: RCRA TSD and Emergency Response Without Regard to Location. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 12p OSWER-9285.2-07FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The purpose of the Fact Sheet is to explain the principle requirements of the EPA and OSHA worker protection standards as they apply to employees who perform emergency response operations irrespective of location and employees who perform hazardous waste operations at RCRA TSD facilities.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Occupational safety and health, Standards, Operations, Personnel development, Emergency plans, Medical records, Occupational exposure, Training, *Office of Solid Waste and Emergency Response, Resource Conservation and Recovery Act.

PB91-921341/REB PC **A02/MF A01**
ARARs Q's and A's: General Policy, RCRA, CWA, SDWA, Post-ROD Information, and Contingent Waivers. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jul 91, 7p OSWER-9234.2-01FS-A
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

These 'ARARs Q's and A's' are part of a series of Fact Sheets that provide guidance on a number of question that arose in developing ARAR policies, in ARARs training session, and in identifying and complying with ARARs at specific sites. This particular Q's and A's Fact Sheet updates and replaces a Fact Sheet which was first issued in May 1989.

Keywords: *Superfund, *Waste management, *Hazardous materials, Environmental policy, Training, Pollution regulations, Standards compliance, Pollution standards, Water pollution control, Water pollution abatement, *Office of Solid Waste and Emergency Response, Applicable or Relevant and Appropriate Requirements, Preremedial actions, Record of Decision, National Contingency Plan.

PB91-921342/REB PC **A03/MF A01**
Establishing Work Zones at Uncontrolled Hazardous Waste Sites. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 12p OSWER-9285.2-06FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The purpose of the Fact Sheet is to summarize the procedures and requirements for establishing and maintaining work zones, including Support Zones at hazardous waste sites.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Occupational safety and health, Procedures, Requirements, Site surveys, Operations, Data processing, Remedial action, Occupational exposure, Standards, Work environments, *Office of Solid Waste and Emergency Response, Work zones.

PB91-921343/REB PC **A01/MF A01**
Superfund Records of Decision Update. Volume 6, Number 3, July 1991. Intermittent bulletin.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jul 91, 5p OSWER-9200.5-216I-VOL-6-NO-3
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The issue of the ROD Update summarizes recent policy concerning the baseline risk assessment and the delisting process. A current list of Regional Coordinators for both Fund Lead and Enforcement Lead sites is also provided.

Keywords: *Superfund, *Waste management, *Hazardous materials, Environmental policy, Baseline measurements, Risk assessment, Law enforcement, Public health, Environmental quality, Remedial action, Exposure, Revisions, *Office of Solid Waste and Emergency Response, Record of Decision.

PB91-921344/REB PC **A02/MF A01**
Innovative Methods to Increase Public Involvement in Superfund Community Relations (Superfund Management Review Recommendation No. 43.A). Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Nov 90, 6p OSWER-9230.0-20
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The directive lists six (6) techniques proven effective in increasing public involvement in the Superfund process. While some are recent innovations, others were developed many years ago, but new and better ways of using them have bolstered their effectiveness. These techniques are citizen work groups, citizen superfund workshops, bilingual communication, citizen awards for participation, increased interviews, and open hous availability sessions. The list does not pretend to be exhaustive. Instead, it shows some of the outreach vehicles Regions have found to be particularly effective in encouraging citizen participation. Regions should make every effort to integrate as many as possible of these activities into the cleanup process.

Keywords: *Superfund, *Waste management, *Hazardous materials, Community relations, Public relations, Decision making, Implementation, Citizen participation, *Office of Solid Waste and Emergency Response, Cleanup operations, Management review.

PB91-921345/REB PC **A01/MF A01**
Minimizing Problems Caused by Staff Turnover (Superfund Management Review: Recommendation No. 43, M, N, O). Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
19 Dec 90, 4p OSWER-9230.0-13
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The directive discusses problems resulting from staff turnover that will likely occur if members of an affected community are not aware that a staff change has been made or why it has been made. The directive lists four (4) major steps designed to ease the transition period and examples of how to carry them out.

Keywords: *Superfund, *Waste management, *Hazardous materials, Administrative procedures, Personnel development, Implementation, Education, Community relations, *Office of Solid Waste and Emergency Response, Management review, Remedial Project Managers, Community Relations Coordinators.

PB91-921346/REB PC **A01/MF A01**
Priority for Health and Safety Requirements, Especially Medical Surveillance Requirements, for EPA Employees Who Support OSWER Programs. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1 Mar 90, 4p OSWER-9285.3-06
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The directive reminds employees that EPA must comply with OSHA's hazardous waste and emergency response worker protection rule (29 CFR 1910.120), EPA health and safety policies contained in EPA 1440 Directives, and OSWER Directive 9285.8-02, 'U.S. Environmental Protection Agency Health and Safety Audit Manual.' The directive gives some specific details regarding medical surveillance, sometimes called medical monitoring requirements.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Occupational safety and health, Requirements, Personnel, Working conditions, Medical records, Occupational exposure, Risk assessment, Pollution standards, *Office of Solid Waste and Emergency Response.

PB91-921347/REB PC **A02/MF A01**
EPA/U.S. Army Corps of Engineers Payment Process, Direct CIte/Revised Reimbursement Methods. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
21 Mar 90, 7p OERR-9295.2-04
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The directive transmits new procedures for the disbursement of funds to the U.S. Army Corps of Engineers (USACE) under EPA lead Superfund projects.

Keywords: *Superfund, *Waste management, *Hazardous materials, Reimbursements, Cost repayment, Administrative procedures, Corps of Engineers, US

EPA, Revisions, State implementation plans, *Office of Solid Waste and Emergency Response.

PB91-921348/REB PC **A02**/MF **A01**
CERCLIS Listing. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
5 Feb 90, 7p OSWER-9320.3-08
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The directive discusses ways to assure rapid entry into the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) of locations identified to or by the Agency as potential hazardous waste release sites. The directive re-emphasizes the use of the Preliminary Assessment Petition and provides a copy of the public educational bulletin, 'Preliminary Assessment Petition.'

Keywords: *Superfund, *Waste management, *Hazardous materials, Listings, Information systems, Site surveys, Public information, Environmental impact assessments, Remedial action, *Office of Solid Waste and Emergency Response, *Preliminary Assessment Petition, Comprehensive Environmental Response Compensation and Liability Data Base.

PB91-921349/REB PC **A04**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Superfund Docket Operations Manual for Rulemaking Activities. Directive.
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Jul 90, 73p OERR-9200.6-02
Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The directive discusses the purpose of the SDIC Operations Manual for Rulemaking Activities which is to serve as a procedural guide for SDIC staff when a rulemaking docket is prepared. These procedures are evaluated on a regular basis, and are revised as needed to keep the SDIC operationally efficient and responsive to its users.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Manuals, Administrative procedures, Pollution regulations, Operations, Guidelines, Revisions, US EPA, Public opinion, Indexes(Documentation), Documentation, Notification procedures, Information transfer, Decision making, Legal aspects, Remedial action, Files(Records), *Office of Solid Waste and Emergency Response, *Superfund Docket and Information Center, National Priorities List.

PB91-921350/REB PC **A02**/MF **A01**
Guide to Developing Superfund No Action, Interim Action, and Contingency Remedy RODs. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 7p OSWER-9355.3-02FS-3
Available separately or as part of PB91-921265.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The guide provides quick reference to the essential components of Records of Decision (RODs) that are prepared to document three specific types of remedial action decisions: (1) no action; (2) interim actions; and (3) contingency remedies. In preparing one of these three types of RODs, Remedial Project Managers (RPMs) should modify the format of the 'standard ROD' for final response actions as indicated in the guide.

Keywords: *Superfund, *Waste management, *Hazardous materials, Guidelines, Contingency planning, Remedial action, Decision making, Substitutes, Standards, *Office of Solid Waste and Emergency Response, *Record of Decision, Preremedial actions, Remedial Project Managers, Remedial response.

PB91-921351/REB PC **A02**/MF **A01**
Guide to Addressing Pre-ROD and Post-ROD Changes. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 7p OSWER-9355.3-02FS-4
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Fact Sheet outlines the methods of categorizing pre- and post-ROD changes and the ways in which changes should be documented. More detailed guidance for pre-ROD changes and both significant and fundamental post-ROD changes can be found in chapters 5 and 8, respectively, of the Interim Final Guidance on Preparing Superfund Decision Documents (OSWER Directive 9355.3-02).

Keywords: *Superfund, *Waste management, *Hazardous materials, Guidelines, Decision making, Remedial action, Substitutes, Information transfer, Revisions, Changes, Proposed remedial orders, *Office of Solid Waste and Emergency Response, Record of Decision, Explanation of Significant Differences.

PB91-921352/REB PC **A02**/MF **A01**
Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites. Supplement to Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites. Directive 7 Sep 89-26 Jan 90.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1990, 6p OSWER-9355.4-02, OSWER-9355.4-02A
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The purpose of the directive (9355.4-02) is to set forth an interim soil cleanup level for total lead, at 500 to 1000 ppm, which the Office of Emergency and Remedial Response and the Office of Waste Programs Enforcement consider protective for direct contact at residential settings. This range is to be used at both Fund-lead and Enforcement-lead CERCLA sites. Further guidance will be developed after the Agency has developed a verified Cancer Potency Factor and/or a Reference Dose for lead. The purpose of the directive (9355.4-02A) is to reiterate that OSWER Directive 9355.4-02 is a guidance document and not a regulation. As is the case with other guidance documents, the guidance should not be used as a regulation.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Public health, Lead(Metal), Guidelines, Soil contamination, Remedial action, Carcinogens, Toxicity, Standards, Dose limits, *Office of Solid Waste and Emergency Response, Cancer Potency Factor, Reference Dose.

PB91-921353/REB PC **A03**/MF **A01**
Superfund Overview Fact Sheet Package.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 90, 23p
Package includes OSWER-9200.5-008A-L.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The package consists of a series of one-page, concise, public-oriented discussions of the various Superfund issues. They are: The Challenge of Superfund, History of Superfund, The Superfund Cleanup Process, Superfund: Fact vs. Fiction, Progress in Cleanup: FY 1980 - FY 1990, FY '90 Superfund Successes, Who Pays for Superfund, Superfund Enforcement - Making Polluters Pay, Superfund Blueprint, Superfund Contracts, Superfund Technology, and Superfund: Future Strategy and Directions.

Keywords: *Superfund, *Waste management, *Hazardous materials, Law enforcement, Technology utilization, Forecasting, History, Payment, Contracts, Site surveys, Administrative procedures, Sources, Remedial action, Liabilities, Rankings, *Office of Solid Waste and Emergency Response, Cleanup operations, National Priorities List, Potentially responsible parties, National Contingency Plan.

PB91-921354/REB PC **A01**/MF **A01**
Environmental Fact Sheet. Superfund Progress: Environmental Indicators. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 90, 4p OSWER-9200.5-007FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The fact sheet provides a brief summary of information contained in the report 'Superfund: Reporting Progress Through Environmental Indicators.'

Keywords: *Superfund, *Waste management, *Hazardous materials, *Environmental quality, *Environmental health, Performance evaluation, Remedial action, Water pollution control, Public health, Soil contamination, Path of pollutants, Exposure, *Office of Solid Waste and Emergency Response, Cleanup operations, National Priorities List.

PB91-921355/REB PC **A01**/MF **A01**
Real Estate Acquisition Procedures for USACE Projects. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Feb 90, 5p OSWER-9355.5-07FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The USACE, because of extensive experience in real estate activities is an appropriate supporting agency for Superfund cleanup when a health based relocation is not required. EPA is authorized to acquire by purchase, lease, donation, condemnation, or otherwise any real property needed to conduct a remedial action. The fact sheet addresses the areas of initial planning, request and approval process, acquisition, summary of the major roles and responsibilities, and the timetable for 104(j) acquisitions. The role of the Remedial Project Manager (RPMs) is discussed.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Real estate, Coordinated procurement, Administrative procedures, Remedial action, Corps of Engineers, US EPA, Property management, Interagency cooperation, Substitutes, Management planning, *Office of Solid Waste and Emergency Response, Cleanup operations, Remedial Project Managers, Preremedial actions.

PB91-921356/REB PC **A02**/MF **A01**
Guide to Pump and Treat Groundwater Remediation Technology. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 90, 6p EPA/540/2-90/018, OSWER-9380.7-01FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The fact sheet summarizes how to use available hydrogeological and chemical data to determine when, where, and how pump-and-treat technology can be used successfully to contain and remediate contaminant plumes. It is based on Office of Research and Development's Basics of Pump-and-Treat Ground-Water Remediation Technology, EPA/600/8-90/003.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Water pollution control, Guidelines, Remedial action, Ground water, Technology utilization, Pumping, Performance evaluation, Chemical compounds, Hydrogeology, Plumes, Data processing, Design criteria, *Office of Solid Waste and Emergency Response, Cleanup operations.

PB91-921357/REB PC **A02**/MF **A01**
EPA Oversight of Remedial Designs and Remedial Actions Performed by PRPs. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Feb 90, 8p OSWER-9355.5-16FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada,

and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Fact Sheet presents an overview of EPA's guidance for oversight of enforcement lead projects in which a Potentially Responsible Party (PRP) conducts the Remedial Design (RD) and Remedial Action (RA). PRP oversight is to ensure that selected remedies are protective of public health and the environment and are in compliance with the Settlement Agreement. For further information, refer to Interim Final Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties, OSWER Directive 9355.5-01, February 1990.

Keywords: *Superfund, *Waste management, *Hazardous materials, US EPA, Remedial action, Guidelines, Law enforcement, Compliance, Environmental protection, Public health, Performance standards, Pollution standards, Quality assurance, *Office of Solid Waste and Emergency Response, Remedial designs, Potentially responsible parties, Remedial Project Managers.

PB91-921358/REB PC **A01**/MF **A01**
Long-Term Contracting Strategy for Superfund - Implementation. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jul 91, 3p OSWER-9242.6-10
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The memorandum clarifies the roles of the Advisory Committee and the Regions in implementing the Long-Term Contracting Strategy for Superfund.

Keywords: *Hazardous materials, *Waste treatment, Advisory committees, Contracts, Regional planning, *Superfund, Strategic planning.

PB91-921359/REB PC **A03**/MF **A01**
Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 11p OSWER-9355.0-30
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The objective of the memorandum is to provide further guidance on how to use the baseline risk assessment to make risk management decisions such as determining whether remedial action under CERCLA Sections 104 or 106 is necessary. The memorandum also clarifies the use of the base line risk assessment in selecting appropriate remedies under CERCLA Section 121, promotes consistency in preparing site-specific risk assessments, and helps ensure that appropriate documentation from the baseline risk assessment is included in Superfund remedy selection documents.

Keywords: *Hazardous materials, *Risk assessment, Decision making, Selection, Sites, Documents, *Superfund, Remedial action.

PB91-921362/REB PC **A02**/MF **A01**
Health and Safety Roles and Responsibilities at Remedial Sites. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 6p OSWER-9285.1-02
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The purpose of the fact sheet is to define the major components of the health and safety program and to delineate the health and safety roles and responsibilities for Remedial Project Managers (RPMs), lead parties/agencies, and contractors during the remedial action phase of Superfund cleanups. It addresses the various roles of all parties in the overall health and safety program for a site, with emphasis on Occupational Safety and Health Act/Agency (OSHA) compliance.

Keywords: *Safety, *Public health, *Hazardous materials, Policies, Requirements, Sites, Guidelines, Protection, Workers, Emergencies, Training, Protective equipment, Air pollution, Monitoring, Decontamination, *Superfund, Cleanup, Remedial action, Occupational health and safety.

PB91-921363/REB PC **A02**/MF **A01**
ARARs Q's and A's Compliance with New SDWA National Primary Drinking Water Regulations for Organic and Inorganic Chemicals. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jul 91, 7p OSWER-9234.2-15FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The report provides guidance on questions that arose in developing ARAR policies, and in indentifying and complying with ARARs at specific sites concerning the new Safe Drinking Water Regulations (Phase II), which were promulgated on January 30, 1991.

Keywords: *Water quality, *Drinking water, *Water pollution, Regulations, Organic compounds, Inorganic compounds, Policies, Sites, States(United States), *Superfund, Safe Drinking Water Regulations of 1991.

PB91-921364/REB PC **A01**/MF **A01**
Guide to Discharging CERCLA Aqueous Wastes to Publicly Owned Treatment Works (POTWs). Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Mar 91, 5p OSWER-9330.2-13FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The guide provides quick reference to the statutory, policy, administrative, and technical factors involved in discharging aqueous wastes generated during Superfund response actions to a POTW.

Keywords: *Waste disposal, *Waste treatment, *Hazardous materials, Government policies, Sites, Feasibility, Sampling, Requirements, Volume, Waste water, Transportation, Licenses, Ordinances, Local government, State government, Response, *Superfund, Publicly owned treatment works, Volatile organic compounds, Pretreatment.

PB91-921365/REB PC **A02**/MF **A01**
Guide: Methods for Evaluating the Attainment of Cleanup Standards for Soils and Solid Media. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jul 91, 8p OSWER-9355.4-04FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The fact sheet highlights statistical concepts and methods used in the evaluation of the attainment of cleanup standards. It provides an example of a basic procedure for determining sample size required to obtain a given confidence level focusing on a cleanup standard specified as a mean concentration with a specified confidence. It does not provide policy on specification of cleanup levels but should be considered a technical reference guide for using some of the more common methodologies.

Keywords: *Hazardous materials, *Waste disposal, Sites, Soils, Sampling, Standards, Technical assistance, Statistical analysis, *Superfund, Clean-up.

PB91-921366/REB PC **A01**/MF **A01**
Furthering the Use of Innovative Treatment Technologies in OSWER Programs. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Aug 91, 5p OSWER-9380.0-17FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The fact sheet provides an overview of directive 9380.0-17, Furthering the Use of Innovative Treatment Technologies in OSWER Programs. The Office of Solid Waste and Emergency Response (OSWER) is seeking to further the use of innovative treatment technologies in order to (1) better pursue its statutory and regulatory mandates to promote treatment to the maximum extent practicable, (2) speed the availability of performance data regarding newly developed treatment technologies to many constituencies facing mandates to clean contaminated sites, (3) broaden the inventory of accepted treatment-based solutions and (4) increase the likelihood the remediation costs can be lowered.

Keywords: *Hazardous materials, *Waste treatment, Sites, Risk, Storage tanks, Expenses, Soils, Sludge disposal, Ground water, Instructions, Cost analysis, *Superfund, *Clean up, Innovative technology, Remedial action.

PB91-921367/REB PC **A01**/MF **A01**
Guide to Obtaining No Migration Variances for CERCLA Remedial Actions. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 5p OSWER-9347.3-10FS
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

A 'No Migration' Variance allows land disposal of restricted wastes not meeting the LDR treatment standards in a specific unit. The guide outlines procedures for obtaining a No Migration Variance for RCRA hazardous wastes as part of a CERCLA response when the LDRs are ARAR.

Keywords: *Hazardous materials, *Waste disposal, *Waste treatment, Sites, Storage, Standards, Environmental transport, Concentration(Composition), Injection wells, Public health, Mathematical models, *Superfund, Vadose zone.

PB91-921368/REB PC **A01**/MF **A01**
Structure and Components of Five-Year Reviews. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Aug 91, 3p OSWER-9355.7-02FS1
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The fact sheet provides guidance for planning and conducting five-year reviews. These include: initiation and termination of reviews; responsibilities and funding; content; and documenting results of reviews. The goal of this fact sheet is to help assure that reviews are implemented in a consistent manner nationally, with appropriate consideration of local concerns and widely varying site conditions.

Keywords: *Waste disposal, *Hazardous materials, Sites, Instructions, Financing, Government policies, Public health, Citizen participation, *Superfund, Remedial action, CERCLA Act as amended, Cleanup, Record of decision.

PB91-921369/REB PC **A03**/MF **A01**
Structure and Components of Five-Year Reviews. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
May 91, 16p OSWER-9355.7-02
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The directive provides guidance primarily on the implementation of five-year reviews and the issues associated with implementation. These include: triggering points for reviews, responsibilities and funding, content, and results of reviews. The goal of this directive is to assure that reviews are implemented in a consistent manner nationally, with appropriate consideration of local concerns and widely varying site conditions.

Keywords: *Hazardous materials, *Waste disposal, Sites, Instructions, Policies, Protection, Exposure, Agreements, *Superfund, Cleanup, Remedial action.

PB91-921370/REB PC **A02**/MF **A01**
Update on Implementation of the Oil Pollution Act of 1990. Volume 1, Number 1, February 1991. Intermittent bulletin.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Feb 91, 6p OSWER-9200.5-115I-VOL-1-NO-1
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The report is one of a series of bulletins intended to provide up-to-date information on EPA's implementation of the various provisions of the Oil Pollution Act of 1990 (OPA). Each 'Update' highlights activities of EPA headquarters and field staff as they develop and enforce the regulations and policies of the high-priority oil pollution program. The 'Update' includes notes from the Regional Workgroup meeting in Galveston, questions and answers concerning OPA, a timeline of major EPA activities/deadlines associated with the OPA, and a list of EPA Implementation Workgroups.

Keywords: *Oil pollution, *Pollution control, Government policies, Regulations, Law enforcement, *Superfund, Oil Pollution Act of 1990, Announcement bulletin, Update.

PB91-921371/REB PC **A02**/MF **A01**
Update on Implementation of the Oil Pollution Act of 1990. Volume 1, Number 2, April 1991. Intermittent bulletin.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 91, 6p OSWER-9200.5-115I-VOL-1-NO-2
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

This is one of a series of bulletins intended to provide up-to-date information on EPA's implementation of the various provisions of the Oil Pollution Act of 1990 (OPA). Each 'Update' highlights activities of EPA headquarters and field staff as they develop and enforce the regulations and policies of the high-priority oil pollution program. The 'Update' includes a spill exercise in Baltimore, MD, practical issues on spill planning/response, the San Diego Oil Spill Conference, the Exxon Valdez (Lessons Learned and What If), oil spills reported in the U.S. (1988-1990), and interim guidelines for bioremediation.

Keywords: *Oil pollution, *Pollution control, Regulations, Government policies, Law enforcement, Project planning, National government, *Superfund, Oil Pollution Act of 1990, Oil spills, Exxon Valdez oil spill, Bioremediation.

PB91-921372/REB PC **A02**/MF **A01**
Update on Implementation of the Oil Pollution Act of 1990. Volume 1, Number 3, June 1991. Intermittent bulletin.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jun 91, 6p OSWER-9200.5-115I-VOL-1-NO-3
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The report is one of a series of bulletins intended to provide up-to-date information on EPA's implmenetation of the various provisions of the Oil Pollution Act of 1990 (OPA). Each 'Update' highlights activities of EPA headquarters and field staff as they develop and enforce the regulations and policies of the high-priority oil pollution program. The 'Update' includes an overview of EPA's Oil Spill Prevention and Response Program, the Bioremediation Spill Response Plan, a roundtable on the National Contingency Plan (NCP), and oil spill statistics.

Keywords: *Oil pollution, *Pollution control, Regulations, Law enforcement, Government policies, Prevention, Response, Statistical data, *Superfund, Oil pollution Act of 1990, Oil spills.

PB91-921373/REB PC **A02**/MF **A01**
Superfund Innovative Technology Evaluation Technology Demonstration Summary: Chemfix Solidification/Stabilization Process, Clackamas, Oregon.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Dec 90, 6p EPA/540/S5-89/011, OSWER-9380.0-48
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The document summarizes the demonstration of Chemfix's patented stabilization/solidification technology at the Portable Equipment Salvage Company (PESC) site in Clackamas, Oregon, as a part of the Superfund Innovative Technology Evaluation (SITE) Program. The chemfix process is designed to solidify and stabilize hazardous wastes in liquids, sludges, soils, and ashes using proprietary additives.

Keywords: *Hazardous materials, *Stabilization, *Waste treatment, Portable equipment, Liquids, Sludge disposal, Soils, Ashes, Additives, Ground water, Sites, Metals, Mobility, *Superfund, *Clackamas(Oregon), Innovative technology.

PB91-921416/REB PC **A12**/MF **A03**
Superfund Record of Decision (EPA Region 1): Kearsarge Metallurgical Corporation, Conway, NH. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 254p EPA/ROD/R01-90/051
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The nine-acre Kearsarge Metallurgical site is an abandoned foundry in the town of Conway, Carroll County, New Hampshire. The site is located within the 100-year floodplain of the Saco River. Pequawket Pond borders the site to the south. The site contains a drainage pipe with four open-bottomed catch basins, two waste piles, a septic tank and leach field, and forested wetlands. A hydrologic study in 1982 revealed contamination of ground water in the upper aquifer underlying the site, a potential drinking water source. The Record of Decision (ROD) addresses both source control and management of migration of the contaminated ground water plume. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including TCE; and metals including chromium.

Keywords: *Pollution control, *Hazardous materials, *Waste disposal, *Ground water, Soils, Debris, Metals, Chromium, Hydrology, *Superfund, Record of Decision, Volatile organic compounds, First Remedial Action-Final, Kearsarge Metallurgical(New Hampshire), *Conway(New Hampshire), Cleanup.

PB91-921417/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 2): Hooker-102nd Street Landfill, Niagara Falls, NY. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
26 Sep 90, 77p EPA/ROD/R02-90/117
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 22-acre Hooker-102nd Street site is a former industrial landfill in the city of Niagara Falls, Niagara County, New York. The site is adjacent to, and partially within the Niagara River's 100-year floodplain. These studies and the Remedial Investigation (RI) initiated in 1984, identified contamination in ground water, onsite and offsite soil, rivershore sediment, and within a storm sewer. Additionally, the presence of a leachate plume of non-aqueous phase liquids (NAPLs) was discovered emanating from the landfill area. The Record of Decision (ROD) is the final remedy which addresses all of the contaminated media. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, TCE, and toluene; other organics including PCBs and phenols; and metals including arsenic.

Keywords: *Pollution control, *Hazardous materials, *Waste disposal, *Ground water, Soil, Sediments, Benzene, Toluene, Polychlorinated biphenyls, Phenols, Metals, *Superfund, Record of Decision, First Remedial Action-Final, Hooker-102nd Street(New York), *Niagara Falls(New York), Volatile organic compounds, Ethylene/trichloro, Cleanups.

PB91-921418/REB PC **A07**/MF **A02**
Superfund Record of Decision (EPA Region 1): Beacon Heights Landfill Site, Beacon Falls, CT. (First Remedial Action), September 1990. (Supplemental). Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 129p EPA/ROD/R01-90/050
See also PB86-134004.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 34-acre Beacon Heights Landfill site is on the northwest corner of an 82-acre property in Beacon Falls, Connecticut. The ROD supplements the 1985 ROD by resolving those determinations left open in the 1985 ROD, including the manner and locations of leachate treatment/disposal; cleanup levels for soil deemed impracticable to cap in areas contiguous to the landfill; and the need for air pollution controls on the landfill gas vents. The primary contaminants of concern affecting the soil, ground water, surface water, and air are VOCs, including benzene, toluene, and xylene.

Keywords: *Pollution control, *Hazardous materials, *Waste disposal, Soil, Surface water, Ground water, Air pollution, Benzene, Toluene, Xylene, *Superfund, Record of Decision, First Remedial Action-Final, Beacon Heights Landfill(Connecticut), *Beacon Falls(Connecticut), Volatile organic compounds, Cleanups.

PB91-921419/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 1): Baird and McGuire/Alternate Water Supply, Holbrook, MA. (Third Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 91p EPA/ROD/R01-90/049
See also PB90-149774 and PB87-189981.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 20-acre Baird and McGuire site is a former chemical manufacturing facility in Holbrook, Massachusetts. The South Street wellfield, part of the municipal water supply for Holbrook, is located within 1,500 feet of the property. The 1986 and 1989 Records of Decision (RODs) addressed all of the previous remedial activities at the site including pumping and onsite treatment of ground water (OU1), as well as onsite excavation and incineration of contaminated soil (OU2), and remediation of the sediment of the Cochato River (OU3). The remedial action addresses the fourth operable unit, provision of an alternate water supply to compensate for the loss of the South Street wellfield and provide an additional 0.31 million gallons/day. Since the previous RODs have addressed all of the site-related contamination, there are no contaminants of concern associated with the remedial action.

Keywords: *Pollution control, *Water supply, *Superfund, Record of Decision, Third Remedial Action-Final, Baird and McGuire(Massachusetts), *Holbrook(Massachusetts).

PB91-921420/REB PC **A17**/MF **A04**
Superfund Record of Decision (EPA Region 1): Old Springfield Landfill, Springfield, VT. (Second Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Sep 90, 399p EPA/ROD/R01-90/033
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada,

and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Old Springfield Landfill site is a 27-acre inactive municipal/industrial landfill approximately one mile from the Springfield city center in Windsor County, Vermont. The site was closed in 1968, and subsequently sold and developed for use as a mobile home park. A nearby resident's complaint about foul-smelling water prompted an investigation of the site by the State, which revealed VOC contamination in a nearby spring and the residential well. Operable unit one is documented in a 1988 Record of Decision (ROD) which addressed management of migration of the contaminated seeps and ground water from the site and required that additional studies would be conducted to determine the source control remedy for the site. The second operable unit ROD documents the source control remedy, which addresses the risks associated with the inhalation of landfill gases and dermal contact with and ingestion of contaminated soil. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes and other organics including PAHs and PCBs.

Keywords: *Pollution control, *Hazardous materials, *Waste disposal, *Ground water, Soil, Benzene, Toluene, Xylenes, Aromatic polycyclic hydrocarbons, Polychlorinated biphenyls, *Superfund, Record of Decision, Second Remedial Action-Final, Windsor County(Vermont), Old Springfield Landfill(Vermont), Volatile organic compounds, Ethylene/trichloro.

PB91-921421/REB PC **A10**/MF **A03**
Superfund Record of Decision (EPA Region 1): Stamina Mills Site, North Smithfield, RI. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 211p EPA/ROD/R01-90/048
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The five-acre Stamina Mills site is a former textile weaving and finishing facility in North Smithfield, Providence County, Rhode Island. A portion of the site is within the 100-year floodplain and wetland area of the Branch River. The manufacturing process used cleaning solvents, acids, bases and dyes for coloring, pesticides for moth proofing, and plasticizers to coat fabrics. Mill process wastes were placed in a landfill onsite. EPA initiated three removal actions from 1984 to 1990, including an extension of the municipal water supply to residents obtaining water from the affected aquifer; and treatment of two underground and one above-ground storage tanks, followed by offsite disposal. The Record of Decision (ROD) provides a final remedy and addresses both source control and management of contaminated ground water migration at the site. The primary contaminants of concern affecting the soil, debris, sediment, and ground water are VOCs including TCE and PCE; other organics including pesticides; and metals including chromium.

Keywords: *Pollution control, *Hazardous materials, *Waste disposal, *Ground water, Soils, Debris, Sediments, Pesticides, Metals, Chromium, *Superfund, Record of Decision, First Remedial Action-Final, Volatile organic compounds, *Stamina Mills(Rhode Island), *North Smithfield(Rhode Island), Cleanup.

PB91-921422/REB PC **A07**/MF **A02**
Superfund Record of Decision (EPA Region 2): Sarney Farm, Amenia, Dutchess County, NY. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 137p EPA/ROD/R02-90/124
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 143-acre Sarney Farm site includes a former 5-acre landfill in Amenia, Dutchess County, New York. Land use in the area is agricultural and includes wetlands. The site overlies a bedrock aquifer, which is currently used as a drinking water source. In 1968, the portion of the site that included a 5-acre sanitary landfill was purchased by Harris Haul-A-Way. Site studies by private parties have identified two trench areas used for hazardous waste disposal, and acting as localized sources of onsite soil contamination. In both areas, soil contaminants have infiltrated into the onsite ground water, but only in limited amounts. One of these areas is addressed in the Record of Decision (ROD). The ROD addresses the remediation of onsite contaminated soil, debris, and ground water in two source areas. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including toluene; other organics including pesticides; and metals including lead.

Keywords: *Pollution control, *Hazardous materials, *Waste disposal, *Ground water, Soils, Debris, Toluene, Pesticides, Metals, *Superfund, Record of Decision, First Remedial Action-Final, Volatile organic compounds, *Dutchess County(New York), Sarney Farm(New York), *Cleanup.

PB91-921423/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 2): Scientific Chemical Processing Site, Carlstadt, Bergen County, NJ. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
14 Sep 90, 93p EPA/ROD/R02-90/109
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 6-acre Scientific Chemical Processing site is a former chemical handling, treatment, and disposal facility in Carlstadt, Bergen County, New Jersey. The site is underlain by a system of three aquifers, all of which have been contaminated by the site. The Record of Decision (ROD) outlines an interim remedy for source control and management of contaminant migration while further study is conducted to find a suitable treatment technology for the onsite wastes. Future RODs will address final source and ground water remedial activities. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, PCE, phenols, TCE, toluene, and xylenes; organics including PAHs, PCBs, and pesticides; metals including arsenic, chromium, and lead; and other inorganics.

Keywords: *Pollution control, *Hazardous materials, *Waste disposal, *Ground water, Soils, Benzene, Phenols, Toluene, Xylenes, Aquifers, Lead, Pesticides, Aromatic polycyclic hydrocarbons, Polychlorinated biphenyls, Metals, Chromium, *Superfund, Record of Decision, First Remedial Action, Scientific Chemical Processing(New Jersey), *Carlstadt(New Jersey), Volatile organic compounds, Cleanup.

PB91-921424/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 2): Sealand Restoration Site, Town of Lisbon, St. Lawrence County, NY. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 60p EPA/ROD/R02-90/104
Portions of this document are not fully legible.
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The 210-acre Sealand Restoration site is a former liquid waste disposal and storage facility in the town of Lisbon, St. Lawrence County, New York. Both wetland and woodland areas are onsite. In 1979, supposedly uncontaminated liquid petroleum wastes and mineral oils were disposed of in several locations. In 1980, the State found Sealand to be in non-compliance by accepting contaminated wastes, permits were revoked, and disposal operations ceased. From 1983 to 1984, the State conducted a remedial investigation that identified several onsite areas of concern. The purpose of the ROD is to review the State action and to determine its appropriateness for reimbursement of costs from Superfund. A follow-up investigation will be conducted to determine the extent of ground water and wetlands contamination. A subsequent ROD will address these media, if deemed necessary. The primary contaminants of concern potentially affecting the soil and debris are VOCs including benzene, TCE, toluene, and xylenes; other organics including PCBs, and pesticides; and metals including chromium and lead.

Keywords: *Pollution control, *Hazardous control, *Waste disposal, *Ground water, Sites, Industrial wastes, Aquifers, Water wells, State government, Removal, Soils, Debris, Benzene, Toluene, Xylenes, Pesticides, Metals, Chromium, Lead(Metal), Pesticides, *Superfund, Record of Decision, First Remedial Action, *Cleanup, *Volatile organic compounds, *Lisbon(New York), Wetlands, Ethylene/trichloro.

PB91-921425/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 2): FAA Technical Center, Area 20A - Salvage Yard, Atlantic County, NJ. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 54p EPA/ROD/R02-90/105
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The 5,000-acre FAA Technical Center site is 8 miles northwest of Atlantic City, in Atlantic County, New Jersey. The site is comprised of several installations including the Atlantic City International Air Terminal, the Upper Atlantic City Reservoir, and the facilities of the FAA Technical Center. A salvage yard (Area 20A), located southeast of the Atlantic City International Terminal, has been used for storing old aircraft parts, automobiles, scrap metal, and empty 55-gallon drums. Soil contamination of Area 20A by PCBs and VOCs has resulted from leaking and deteriorating drums that have been stored onsite. The primary contaminants of concern affecting the soil and ground water are VOCs including TCE and toluene; other organics including PCBs; and metals including chromium. The Record of Decision (ROD) addresses soil and ground water contamination.

Keywords: *Pollution control, *Hazardous materials, *Waste disposal, *Ground water, Soils, Toluene, Polychlorinated biphenyls, Metals, Chromium, *Superfund, Record of Decision, First Remedial Action-Final, Volatile organic compounds, *Atlantic County(New Jersey), FAA Technical Center(New Jersey), *Cleanup.

PB91-921426/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 2): Woodland Township Route 72 and Route 532 Dump Sites, Burlington County, Chatsworth, NJ. (First Remedial Action), May 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
16 May 90, 102p EPA/ROD/R02-90/102
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 20-acre Woodland Route 532 Dump site is an abandoned hazardous waste dump in Woodland Township, Burlington County, New Jersey. The site is being remediated concurrently with another abandoned dump, the 12-acre Woodland Route 72 Dump site, located 3 miles from the Route 532 site. Both sites are in the Pinelands Preservation Area District of New Jersey. An estimated total of 54,000 cubic yards (Route 72, 28,000 cubic yards; Route 532, 26,000 cubic yards) of surface material including surface soil, stream sediment, sludge, and debris at the sites are contaminated with wastes including tarry substances and paint residues. The Record of Decision (ROD) addresses surface material and ground water remediation at both sites. A subsequent ROD will address subsurface soil. The primary contaminants of concern affecting the surface soil, sediment, sludge, debris, and ground water are VOCs including benzene, toluene, TCE and xylenes; organics including PAHs, pesticides, and phenols; radionuclides (e.g., uranium and thorium series); and metals including lead and chromium.

Keywords: *Pollution control, *Waste disposal, *Hazardous materials, *Ground water, Soils, Sediments, Sludge, Benzene, Toluene, Xylenes, Phenols, Pesticides, Metals, Aromatic polycyclic hydrocarbons, *Superfund, Record of Decision, Woodland Route 532

Dump, *Burlington County(New Jersey), First Remedial Action, *Cleanup.

PB91-921427/REB PC **A07**/MF **A02**
Superfund Record of Decision (EPA Region 2): Hooker Chemical/Ruco Polymer Site, Hicksville, NY. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 146p EPA/ROD/R02-90/121
See also PB87-189957.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 14-acre Hooker Chemical/Ruco Polymer site is an active polymer production facility in Hicksville, Nassau County, New York. Surrounding land use is primarily industrial and commercial, and a residential area is located near the site. Since 1984, site investigations have identified four onsite areas of PCB contamination. These include a direct spill area where releases of heat transfer fluid escaped through a relief valve at the pilot plant, a transport area contaminated by PCBs spread from the direct spill area by onsite truck traffic, the recharge basin that was contaminated by surface runoff, and soil contamination around an underground fuel storage tank, which was disposed of offsite in 1989. The Record of Decision (ROD) addresses remediation of Operable Unit 2 (OU2), the PCB-contaminated soil at the above locations. Remediation of remaining site areas, VOC-contaminated soil, and ground water will be addressed as OU1 in a subsequent ROD. The primary contaminants of concern affecting the soil and debris are PCBs.

Keywords: *Pollution control, *Hazardous materials, *Waste disposal, Soils, Debris, Polychlorinated biphenyl, Metals, Groundwater, Excavation, *Superfund, Record of Decision, First Remedial Action, *Nassau County(New York), Volatile organic compounds, *Cleanup, *Hicksville(New York).

PB91-921428/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 2): Myers Property, Franklin Township, NJ. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 108p EPA/ROD/R02-90/115
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Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 7-acre Myers Property site is a former pesticide and industrial chemical manufacturing facility in Franklin Township, Hunterdon County, New Jersey. The site lies adjacent to, and in the 100-year floodplain of the Cakepoulin Creek which flows to the north of the site. The site is comprised of adjourning private lands, two acres of wetlands, and five acres of residential property with onsite residents. In 1978, State investigations identified 20 unlabeled drums of chemicals containing metals, DDT, other organic chemicals in a shed, and 24 cubic yards of asbestos material in an onsite warehouse. In addition, surface soil and debris were found to be contaminated with high levels of DDT, other organics, and metals. The Record of Decision (ROD) addresses the first of two operable units, and includes remediation of the soil, sediment, buildings, and shallow ground water aquifer. The ROD also addresses interim remedial activities for the second operable unit, the ground water in the bedrock aquifer, which will be fully addressed in a future ROD. The primary contaminants of concern affecting the soil, sediment, debris, and ground water are VOCs including benzene; other organics including PCBs, PAHs, dioxin, and pesticides such as DDT; and metals including arsenic, and lead.

Keywords: *Pollution control, *Hazardous materials, *Waste disposal, *Ground water, Soils, Debris, Aquifer, Sediments, Polychlorinated biphenyls, DDT, Lead(Metal), Arsenic, Metals, Aromatic polycyclic hydrocarbons, Pesticides, Benzene, *Superfund, Record of Decision, First Remedial Action, *Hunterdon County(New Jersey), Cleanups.

PB91-921429/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 2): M and T DeLisa Landfill Site, Monmouth County, NJ. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
20 Sep 90, 50p EPA/ROD/R02-90/108
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 132-acre M&T DeLisa Landfill site is northwest of the city of Asbury Park in Ocean Township, New Jersey. The 39-acre M&T DeLisa landfill was operated with a State permit from 1914 until 1974. After the landfill was closed, a private company constructed a shopping mall on 30 acres of the landfill. The developer took control measures to protect against the generation of landfill gases and leachate. Although landfill gas is generated at the site and slightly elevated levels of VOC accumulation were detected on the northern edge of the mall, sampling and analysis indicate that the landfill is not the source of detectable levels of VOCs in the mall. The developer installed storm drainage from the parking lot to protect Deal Lake Brook, which is the nearest surface water and is immediately south of the mall. Onsite surface water and ground water are not used as sources of potable water. Site investigations and historical research on site activities revealed no evidence to indicate that the landfill was used for hazardous waste disposal. There are no contaminants of concern affecting the site, therefore, this is a no action Record of Decision (ROD).

Keywords: *Waste disposal, *Pollution control, New Jersey, *Superfund, *First remedial action-Final, Record of Decision, M&T DeLisa Landfill, Asbury Park(New Jersey), Ocean Township(New Jersey).

PB91-921430/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 2): Lone Pine Landfill, Freehold Township, Monmouth County, NJ. (Second Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 92p EPA/ROD/R02-90/106
See also PB85-213726.Portions of this document are not fully legible.
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The 45-acre Lone Pine Landfill site is an abandoned, privately owned waste disposal facility in Freehold Township, Monmouth County, New Jersey. The site lies within a semi-wooded wetlands area, and in the Manasquan River floodplain. Contaminated ground water underlies the site within the surficial Water Table Aquifer and the deeper Red Bank Aquifer. Ground water from both aquifers discharges into the Manasquan River downgradient from the site. A 1984 Record of Decision (ROD) addressed Operable Unit One (OU1), the source control remedy, which included constructing a landfill containment system; capping the landfill; installing a slurry wall around the landfill perimeter; and collecting and treating leachate from within the slurry wall containment area. The ROD addresses OU2, contaminated ground water outside of the containment system. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, phenols, TCE, toluene, and xylenes; and metals including arsenic, chromium, and lead.

Keywords: *Pollution control, *Waste disposal, *Ground water, *Hazardous materials, Benzene, Phenols, Toluene, Xylenes, Metals, Water pollution, Aquifer, *Superfund, Record of Decision, Second Remedial Action-Final, Freehold Town(New Jersey), *Monmouth County(New Jersey), *Cleanups.

PB91-921431/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 2): Montclair/West Orange Radium Site, Essex County, NJ. (Second Remedial Action), June 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1 Jun 90, 61p EPA/ROD/R02-90/126
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 120-acre Montclair/West Orange Radium site is comprised of 239 residential properties in the Town of Montclair and 127 residential properties in the Town of West Orange, Essex County, NJ. The site is located in proximity to the Glen Ridge Radium, Superfund site. In the early 1900s, a radium processing or utilization facility was located near the site. It is suspected that radioactive waste material from the facility was disposed of in then rural areas within the community. EPA investigations in 1981 and 1983, confirmed the presence of gamma radiation contamination in the Glen Ridge area and in several adjacent houses. Subsequently, EPA established an air quality monitoring program to determine the levels of radon decay products in the contaminated houses. The ROD also addresses contaminated onsite soil, and is a final source control remedy. The primary contaminants of concern affecting the soil are radioactive materials, especially radium-2 and metals including lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Soils, Sites, Describing, Industrial wastes, Volume, Contaminants, Radium 266, Metals, Excavation, National government, State government, Cost analysis, Lead(Metal), Gamma rays, Radioactive wastes, Radon, *Superfund, Record of Decision, Second Remedial Action-Final, *Cleanup, Volatile organic compounds, *Montclair(New Jersey), *West Orange(New Jersey).

PB91-921432/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 3): Avtex Fibers Site, Front Royal, VA. (Second Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 57p EPA/ROD/R03-90/093
See also PB89-206197.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 440-acre Avtex Fibers site is a former synthetic fibers manufacturing facility in Front Royal, Warren County, Virginia. A section of the site lies within the 100-year Shenandoah River floodplain. The plant produced rayon (1940-1989), polyester (1970-1977), and polypropylene fibers (1985-1989). Until 1983, the byproducts, including sodium cellulose xanthate-based viscose waste and zinc hydroxide sludge, were disposed of onsite in unlined surface impoundments or landfills. Subsequently, the waste was routed to an onsite wastewater treatment facility. Fly ash (fromincinerator exhaust air pollution control devices) and boiler house solids were disposed of in four other surface impoundments. In 1982, a State investigation identified carbon disulfide, a constituent of viscose waste, in residential wells located across the river from the plant. In 1983 and 1984, in response to the result of the investigation, Avtex implemented interim measures to address the ground water contamination by purchasing 23 subdivision properties in the area with contaminated ground water. The ROD addresses the removal of PCB-contaminated soil, breakdown of the acid reclamation facility, and the disposal of drummed wastes thought to contain oils, bases, acids, solvents, and PCBs.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrialwastes, Volume, Contaminants, Synthetic fibers, Alkene compounds, Polyester fibers, National government, State government, Cost analysis, Earth fills, Sodium compounds, Cellulose, Viscose, Fly ash, Carbon disulfides, *Superfund, Record of Decision, Second Remedial Action, *Cleanup, Volatile organic compounds, *Front Royal(Virginia), Polychlorinated biphenyls.

PB91-921433/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 3): Fike/Artel Chemical Site, Nitro, WV. (Second Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 47p EPA/ROD/R03-90/105
See also PB89-189476.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada,

and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 11.9-acre Fike Chemical site is an abandoned chemical manufacturing facility in Nitro, West Virginia. The site is comprised of an 11-acre chemical plant and a 0.9-acre Cooperative Sewage Treatment plant (CST). Onsite features include several chemical production areas, process control equipment, various onsite structures, drum and waste burial areas, over 400 storage tanks, and 3 inactive waste lagoons. From 1951 to 1988, Fike Chemical manufactured more than sixty different chemicals. In 1983, EPA identified onsite dioxin-contaminated soil. In addition, asbestos was found in several onsite structures. A 1988 Record of Decision (ROD) addressed the disposal of bulk chemicals stored in onsite tanks and drums. In 1990, a Focused Feasibility Study (FFS) for the tanks, equipment, and structures was completed. The ROD addresses the contaminated tanks, equipment, and structures evaluated in the 1990 FFS report.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial waste treatment, Volume, Contaminants, Chemical industry, Asbestos, National government, State government, Cost analysis, Waste treatment, Storage tanks, Equipment, Removal, Structures, *Superfund, Record of Decision, Second Remedial Action, *Cleanup, Volatile organic compounds, *Nitro(West Virginia).

PB91-921434/REB PC **A07/MF A01**
Superfund Record of Decision (EPA Region 3): Keystone Sanitation Landfill Site, Adams County, Union Township, PA. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Sep 90, 148p EPA/ROD/R03-90/101
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The 40-acre Keystone Sanitation Landfill site, an inactive, privately owned landfill, is in Union Township, Adams County, Pennsylvania. Surrounding land use is primarily agricultural with scattered residences. From 1966 to 1990, the unlined landfill accepted household and municipal wastes as well as industrial and construction debris, including phosphorus-contaminated sand, potato sludge, resin sludge, incineration ash, anddried latex paint. In 1982, State investigations revealed onsite ground water contamination and a contaminated onsite residential well. In 1984, EPA found low-level contamination in nearby residential wells. The Record of Decision (ROD) addresses Operable Unit 1, the containment of onsite source area and remediation of onsite contaminated ground water. A subsequent ROD will address offsite ground water contamination in monitoring and residential wells. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, PCE, TCE, vinyl chloride; other organics including acids, and phenols; and metals including chromium and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Earth fills, Sites, Describing, Industrial wastes, Volume, Contaminants, Metals, Chromium, Water wells, National government, State government, Cost analysis, Lead(Metal), Benzene, Phenols, Ground water, Municipalities, Organic acids, *Superfund, Record of Decision, Remedial Action, *Cleanup, Volatile organic compounds, *Union Township(Pennsylvania), Trichloroethylene.

PB91-921435/REB PC **A07/MF A01**
Superfund Record of Decision (EPA Region 3): Croyden TCE Site, Bristol Township, Bucks County, PA. (Second Remedial Action), June 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Jun 90, 134p EPA/ROD/R03-90/088
See also PB89-229512.Portions of this document are not fully legible.
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The Croydon TCE site is in Bristol Township, Bucks County, Pennsylvania. A series of studies conducted by EPA beginning in 1984 led to the detection of VOC contamination in the ground water over a 3.5-square mile area referred to as the study area. The 1990 ROD addresses the remediation of the ground water contamination at the site. The primary contaminants of concern affecting the ground water are VOCs including TCE and 1,1-DCE.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Ground water, Monitoring, Aliphatic hydrocarbons, National government, State government, Cost analysis, *Superfund, Record of Decision, Second Remedial Action, *Cleanup, Volatile organic Compounds, Trichloroethene, *Bucks County(Pennsylvania).

PB91-921436/REB PC **A04/MF A01**
Superfund Record of Decision (EPA Region 2): Glen Ridge Radium Site, Essex County, NJ. (Second Remedial Action), June 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1 Jun 90, 62p EPA/ROD/R02-90/125
See also PB90-114695.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 90-acre Glen Ridge Radium site is a residential community in the Borough of Glen Ridge, Essex County, New Jersey. The site is adjacent to another Superfund site, the Montclair/West Orange site. The Glen Ridge site includes a community of 274 properties serviced by surface reservoirs in northern New Jersey. In the early 1900s, a radium processing or utilization facility was located in the vicinity of the site. EPA investigations in 1981 and 1983 confirmed the presence of gamma radiation contamination in the Glen Ridge area and in several adjacent houses. The ROD complements the previous 1989 ROD for this site and provides a final remedy. The primary contaminant of concern affecting the soil is radium 226.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Soils, Sites, Describing, Industrial wastes, Volume, Contaminants, Radium 226, Gamma rays, Residential buildings, National government, State government, Cost analysis, Radon, Water supply, Tests, Monitoring, *Superfund, Record of Decision, Second Remedial Action-Final, *Cleanup, Volatile organic compounds, *Essex County(New Jersey), Glenn Ridge(New Jersey).

PB91-921437/REB PC **A05/MF A01**
Superfund Record of Decision (EPA Region 3): Brown's Battery Breaking Site, Tilden Township, PA. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 92p EPA/ROD/R03-90/094
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 14-acre Brown's Battery Breaking site is an inactive lead-acid battery processing facility in Tilden Township, Berks County, Pennsylvania. The area surrounding the site is primarily agricultural with scattered rural residences. The site is bordered by Conrail tracks, Mill Creek, and the Schuylkill River. The State conducted onsite and offsite investigations during the 1980s that identified lead concentrations in excess of acceptable limits in residents, livestock, soil, and surface waters. A 1983 EPA investigation revealed extensive lead contamination in onsite soil and sediment located in the Schuylkill River. EPA initiated an Immediate Removal Request to relocate three families and to excavate and consolidate 13,000 cubic yards of contaminated soil and battery casings into an onsite containment area. A second removal, initiated in 1990, consisted of temporarily relocating all onsite residents. The Record of Decision addresses site access; subsequent actions will address soil and ground water remediation. The primary contaminant of concern affecting the soil, sediment, ground water, and surface water is lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Lead(Metal), Excavation, National government, State government, Cost analysis, Soils, Sediments, Schuylkill River, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Berks County(Pennsylvania), Tilden Township(Pennsylvania).

PB91-921438/REB PC **A03/MF A01**
Superfund Record of Decision (EPA Region 3): Butz Landfill Superfund Site, Jackson Township, Monroe County, PA. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 48p EPA/ROD/R03-90/095
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Butz Landfill site is an inactive landfill in Jackson Township, Monroe County, Pennsylvania. The sole-source aquifer underlying the site supplies drinking water for the vicinity, which includes approximately 3,300 people who live within three miles of the site. Beginning in 1965, municipal waste, sewage sludge/liquids, and possibly some industrial wastes were accepted at the landfill. In 1971, onsite investigations revealed well water contamination and the presence of leachate seeps. By 1973, the State ordered the landfill closed and required that corrective measures by taken. Additional onsite investigations in 1986 revealed high TCE levels in domestic wells to the south of the landfill, which prompted a request to EPA that the site be considered for emergency action. The Record of Decision addresses the first operable unit, which establishes an alternate water supply. Subsequent operable unit(s) will address remediation of the contaminated soil, surface water, and ground water. The primary contaminants of concern affecting the ground water are VOCs, including PCE and TCE.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Water wells, Excavation, National government, State government, Cost analysis, Earth fills, Alkene hydrocarbons, Trichloroethylene, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, *Monroe County(Pennsylvania), Jackson Township.

PB91-921439/REB PC **A05/MF A01**
Superfund Record of Decision (EPA Region 3): Sand, Gravel and Stone Site, Elkton, MD. (Second Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 81p EPA/ROD/R03-90/098
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The 200-acre Sand, Gravel and Stone site is a former sand and gravel quarry three miles west of the town of Elkton, in Cecil County, Maryland, along a tributary to Mill Creek. Surface water in Mill Creek eventually flows to the Elk River and the Chesapeake Bay. Beginning in 1969, hazardous materials were disposed of onsite. In 1974, a pool of chemical waste burned in a onsite fire. The site has been separated into three operable units (OU). The ROD focuses on OU2, the threat posed by soil and ground water contamination migrating from the eastern portion of the site, including remediation of ground water contamination in the lower aquifers if needed. A future ROD will address OU3. The primary contaminants of concern affecting the ground water are VOCs, including benzene and toluene; and metals.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Metals, Pits(Excavations), National government, State government, Cost analysis, Benzene, Toluene, Sands, Gravel, *Superfund, Record of Decision, Second Remedial Action, *Cleanup, Volatile organic compounds, *Cecil County(Maryland), Elkton(Maryland).

PB91-921440/REB PC **A09**/MF **A01**
Superfund Record of Decision (EPA Region 3): Osborne Landfill Site, Pine Township, Mercer County, PA. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 177p EPA/ROD/R03-90/099
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The 15-acre Osborne Landfill site is an inactive abandoned coal strip mine in Pine Township, Mercer County, Pennsylvania. The site is in a semi-rural area with a large natural pond, woodlands, and wetlands bordering the site to the west. The shallow Clarion aquifer is present east of the strip mine highwall. The portion of the aquifer that formerly overlaid the site was excavated during stripping activities. From the late 1950s to 1978, contaminated spent foundry sand and other industrial and municipal wastes were disposed of into the pit. Other wastes including trash and drums containing solvents, wastewater, and coolants, were disposed of onsite. The site holds an estimated 233,000 cubic yards of fill material. EPA has divided the remedial action into five operable units. The ROD addresses the remaining three operable units. The primary contaminants of concern affecting the sediment and ground water are VOCs including benzene and TCE; other organics including PCBs and PAHs; and metals including arsenic, chromium, and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Polychlorinated biphenyls, Polycyclic aromatic hydrocarbons, Pits(Excavations), National government, State government, Cost analysis, Benzene, Earth fills, Metals, Concentration(Composition), Aquifers, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Mercer County(Pennsylvania).

PB91-921441/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 3): East Mt. Zion Landfill, Springettsbury Township, York County, PA. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1990, 87p EPA/ROD/R03-90/103
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 10-acre East Mt. Zion site is a privately owned, inactive landfill in Springettsbury Township, York County, Pennsylvania. The landfill is on a forested ridge along with recreational park lands and a residential subdivision. From 1955 to 1972, domestic, municipal and industrial wastes were disposed of onsite. In 1969 and 1971, the landfill was cited for improper disposal practices and was subsequently closed by the State in 1972. In 1983 and 1988, State investigations identified several contaminants in onsite ground water and leachate. The Record of Decision (ROD) addresses the ground water contamination by inhibiting the mobility of contaminants from the landfill. The primary contaminants of concern affecting the ground water are VOCs including vinyl chloride and benzene.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Benzene, Vinyl chloride, Excavation, National government, State government, Cost analysis, Earth fills, Leaching, Monitoring, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *York County(Pennsylvania).

PB91-921442/REB PC **A06**/MF **A01**
Superfund Record of Decision (EPA Region 4): Harris/Palm Bay Facility, Palm Bay, Brevard County, FL. (First Remedial Action), June 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Jun 90, 112p EPA/ROD/R04-90/065
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 345-acre Harris/Palm Bay Facility site is an electronics manufacturing company in Palm Bay, Brevard County, Florida. Surrounding land use is commercial, residential, and industrial. The site overlies an unconsolidated aquifer, which is used by a public wellfield located south of and downgradient of the site, from the 1950s to 1967. In 1981, EPA identified VOCs in ground water wells located south of the Government Systems facility. Ground water contamination was attributed to several onsite incidents at the Government Systems plant including two fires, which resulted in the dumping of chemical vats, a broken acid/solvent line, and spillage at drum storage areas. The primary contaminants of concern affecting the ground water are VOCs including TCE; metals including chromium and lead; and other inorganics including fluoride.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Metals, Chromium, Water wells, National government, State government, Cost analysis, Lead(Metal), Trichloroethylene, Chlorine organic compounds, Solvents, Fluorides, Inorganic compounds, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Brevard County(Florida), Palm Bay(Florida).

PB91-921443/REB PC **A13**/MF **A02**
Superfund Record of Decision (EPA Region 4): North Hollywood Dump, TN. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
13 Sep 90, 277p EPA/ROD/R04-90/068
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 70-acre North Hollywood Dump site is an inactive, privately owned landfill in Memphis, Shelby County, Tennessee, in the Wolf River floodplain. Directly beneath the site is a contaminated aquifer from which ground water discharges directly to the Wolf River. From the mid-1930s until its closure in 1967, municipal and industrial refuse were disposed of at the site, which was operated by the city of Memphis. A precise description of the materials disposed of is unknown. In 1979 and 1980, EPA and State studies revealed various contaminants both onsite and offsite in soil, sediments, ground water, surface water, and fish. Commercial fishing activities in the Wolf River ceased, and EPA required removal of contaminated soil, capping of the landfill, and fencing of the site. The Record of Decision (ROD) addresses all of the contaminated media by containing the source areas. The primary contaminants of concern affecting the soil, sediment, debris, ground water, and surface water are organics including aldrin, endrin, chlordane, and pesticides; and metals including arsenic and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Pesticides, Aquifers, Earth fills, National government, State government, Cost analysis, Metals, Arsenic, Lead(Metal), Wolf River, Fishes, Chlorodan, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Memphis(Tennessee), Shelby County(Tennessee).

PB91-921444/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 4): Dubose Oil Products Site, Cantonment, Escambia County, FL. (First Remedial Action), March 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Mar 90, 69p EPA/ROD/R04-90/071
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 20-acre Dubose Oil Products site is an inactive waste storage, treatment, recycling, and disposal facility in Cantonment, Escambia County, Florida. Surrounding land use is primarily rural agricultural. The site overlies a deep aquifer, which serves as a drinking water source for area residents. Site operations began in 1979, and included thermal treatment of waste oil, petroleum refining wastes, oil based solvents, and wood treatment wastes; steam heating of spent iron/steel pickle liquors; and rock salt filtration of waste diesel fuel. Operations ceased in 1981, and the site owner commenced closure of the site without a proper closure plan. Site investigations in 1988 identified the soil containment vault as the principal contaminant source and this Record of Decision addresses final remediation of source areas and onsite shallow ground water. The primary contaminants of concern affecting the soil, sediment, ground water, and surface water are VOCs including benzene, TCE, toluene, and xylenes; and other organics including PAHs and phenols.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Petroleum refining, Soils, Excavation, National government, State government, Cost analysis, Aquifers, Benzene, Toluene, Xylenes, Phenols, Surface waters, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, *Escambia County(Florida), Cantonment(Florida), Trichloroethylene.

PB91-921445/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 4): Kassouf-Kimerling Battery Site, Tampa, Hillsborough County, FL. (Second Remedial Action), March 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Mar 90, 60p EPA/ROD/R04-90/072
See also PB90-107590.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Kassouf-Dimerling Battery Disposal site, formerly known as the Timber Lake Battery Disposal site and the 58th Street Landfill, is in Tampa, Hillsborough County, Florida within a 100-year floodplain area. The site consists of a 42,000 square foot landfill area with an estimated landfill volume of 11,350 cubic yards. Surface water flows from the west marsh to the east marsh by way of a canal which cuts through the site, connects the marsh areas, and eventually discharges into the Palm River. In 1978, empty battery casings were deposited in previously excavated onsite areas. The first Operable Unit Record of Decision (ROD) addressed remediation of landfill wastes and contaminated underlying soil. The ROD addresses contamination of wetlands adjacent to the landfill. The primary contaminants of concern affecting the sediment and surface water are metals including arsenic, chromium, and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Surface waters, *Ground water, Describing, Industrial wastes, Volume, Contaminants, Wetlands, Metals, National government, State government, Cost analysis, Earth fills, Surface waters, Sediments, Arsenic, Chromium, Lead(Metal), *Superfund, Record of Decision, Second Remedial Action-Final, *Cleanup, Volatile organic compounds, *Tampa(Florida).

PB91-921446/REB PC **A08**/MF **A02**
Superfund Record of Decision (EPA Region 4): National Starch and Chemical Corporation Site, Salisbury, NC. (Second Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 168p EPA/ROD/R04-90/073
See also PB89-182497.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 465-acre National Starch and Chemical site is a manufacturing facility for textile finishing and custom speciality chemicals in Rowan County, North Carolina. A portion of the site is heavily wooded, and surrounding land use is mixed industrial and residential. From 1971 to 1978, approximately 350,000 gallons of reaction vessel washwater containing salt brines, sulfuric

acid solutions, and solvents were disposed of onsite in unlined trenches. A 1988 Record of Decision (ROD) addressed Operable Unit 1 (OU1), which called for onsite ground water pumping and treatment, and further investigation of soil contamination in the trench area, continued surface water and sediment monitoring and a supplemental remedial investigation (RI). The ROD addresses OU2, and identifies no further action as the remedy for the trench area soil based on the supplemental RI. A subsequent ROD will address OU3.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Chemical industry, Solvents, Excavation, National government, State government, Cost analysis, Brines, Sulfuric acid, Sediments, *Superfund, Record of Decision, Second Remedial Action, *Cleanup, Volatile organic compounds, *Rowan County(North Carolina).

PB91-921447/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 4): SCRDI Bluff Road Site, Columbia, Richland County, SC. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
12 Sep 90, 116p EPA/ROD/R04-90/074
See also PB87-187779.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 4-acre SCRDI Bluff Road site is an inactive chemical waste manuFacturing, storage, recycling, and disposal facility in Richland County, South Carolina. Surrounding land use is rural residential and industrial, and part of the site has been classified as a wetlands area. All operations at the site ceased in 1982 after State investigations identified onsite soil and ground water contamination. From 1982 to 1983, the State addressed the site contamination and required the removal of over 7,500 drums containing various chemicals, visibly contaminated soil, and above-ground structures. The Record of Decision (ROD) addresses remediation of both the contaminant source and ground water. The primary contaminants of concern are VOCs including benzene, toluene, PCE, TCE, and xylenes, other organics including PCBs, phenols, and pesticides; and metals.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Phenols, Pesticides, Excavation, National government, State government, Cost analysis, Metals, Trichloroethylene, Polychlorinated biphenyls, Soils, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Richland County(South Carolina), Wetlands.

PB91-921448/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 4): Pickettville Road Landfill, Jacksonville, Duval County, FL. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 95p EPA/ROD/R04-90/075
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 52-acre Pickettville Road Landfill site is an inactive municipal landfill in Jacksonville, Duval County, Florida. From the 1940s to the 1960s, the site was used primarily as a sand borrow pit. From 1968, when landfilling operations began, to 1971, the municipal landfill accepted all types of wastes. Subsequently, the landfill accepted hazardous wastes exclusively. Several investigationsfrom 1979 to 1990, characterized the affected media and the nature and extent of onsite and offsite contamination. The Record of Decision addresses both source control and management of contaminant migration, and is a final remedy for the site. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including benzene, TCE, and toluene; other organics including acids and PCBs; and metals including arsenic, chromium, and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Earthfills, Sites, Describing, Industrial wastes, Volume, Contaminants, Metals, Polychlorinated biphenyls, Municipalities, National government, State government, Cost analysis, Benzene, Toluene, Organic acids, Ground water, Soils, Leaching, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, *Jacksonville(Florida), Trichloroethylene.

PB91-921449/REB PC **A07**/MF **A01**
Superfund Record of Decision (EPA Region 4): Cabot Carbon/Koppers Site, Gainesville, Alachua County, FL. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 139p EPA/ROD/R04-90/077
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 99-acre Cabot/Koppers site is a pine tar and charcoal generation facility in Gainesville, Alachua County, Florida. The site is underlain by shallow and intermediate aquifers. Land in the site vicinity is used for commercial and residential purposes. Pine tar and charcoal generation operations in the early 1900s generated a large number of blended solvents as by-products. Resultant wastewaters were treated onsite in a lagoon. The Koppers portion of the site has been operated since 1916 as a wood preserving operation. Between 1980 and 1989, various site investigations by the State, EPA and private parties identified soil contamination in the three lagoons, the inactive cooling pond, the drip tracks, and a wood shavings pile. The Record of Decision (ROD) addresses contaminated onsite soil and ground water. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene; other organics including oils, phenols, and PAHs; and metals including arsenic and chromium.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Polycyclic aromatic hydrocarbons, Sites, Describing, Industrial wastes, Volume, Contaminants, Solvents, Charcoal, Lagoons(Ponds), National government, State government, Cost analysis, Wood preservatives, Phenols, Benzene, Metals, Arsenic, Soils, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Gainsville(Florida).

PB91-921450/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 5): Tri-State Plating, Columbus, IN. (First Remedial Action), March 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Mar 90, 34p EPA/ROD/R05-90/122
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 3,900-square foot Tri-State Plating site is an abandoned metal plating facility in Columbus, Bartholomew County, Indiana. Land use in the vicinity of the site is residential and industrial. Metal plating operations at the site began during the 1940s. In 1983, the State identified soil contaminated with chromium, lead, and other metals, which was thought to be a result of an onsite waste spill. In 1984, following additional onsite waste disposal violations, onsite spills, and the failure of Tri-State plating to install an onsite waste treatment system, the State blocked sewers from the site and cut off the water supply. From 1987 to 1989, in two separate actions, EPA removed 27 drums of inorganic material from the storage building, excavated contaminated onsite soil, decontaminated and demolished all onsite structures. This ROD addresses the contaminated onsite ground water. The primary contaminants of concern affecting the ground water are metals including chromium.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Metals, Chromium, Excavation, National government, State government, Cost analysis, Lead(Metal), Soils, Electroplating, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, *Columbus(Indiana).

PB91-921451/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 5): Fisher-Calo Chem, Kingsbury, IN. (First Remedial Action), August 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
7 Aug 90, 80p EPA/ROD/R05-90/128
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Fisher Calo Chem site is in LaPorte County, Indiana. The site is comprised of the 33-acre One-Line Road facility, the 340-acre Two-Line Road facility, and the 170-acre Space Leasing facility. Surrounding the site are woodlands, grasslands, wetlands, and a wildlife area. Site contamination at all three facilities is the result of the production and distribution of industrial chemicals, and reclamation of waste paint and metal finishing solvents. In 1982, EPA initiated site investigations that revealed elevated levels of organic compounds in ground water, heavy metals in the soil, and evidence of additional buried drums. The Record of Decision addresses the remaining contaminated areas including the soil, waste material and structures at the site, and contaminated ground water in aquifers underlying the site. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including TCE, toluene, xylenes; other organics including PAHs and PCBs; and asbestos.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Soils, Aquifers, Excavation, National government, State government, Cost analysis, Trichloroethylene, Toluene, Xylenes, Polychlorinated biphenyls, Asbestos, Polycyclic aromatic hydrocarbons, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds.

PB91-921452/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 5): Wheeler Pit Site, La Prairie Township, WI. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 83p EPA/ROD/R05-90/130
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 3.4-acre Wheeler Pit site is a former industrial waste disposal pit in LaPrairie Township, approximately 1-1/2 miles from Janesville, Wisconsin. The soil beneath the site is generally sand and gravel, and the uppermost aquifer serves as a major source of drinking water for the Janesville area. From 1900 to the 1970s, the site was used as a sand and gravel pit by a railroad company. From 1960 to 1974, GMC disposed of an estimated 22.3 million gallons of industrial wastes, including paint spray booth sludges, residue from part hanger stripping systems, clarifier sludges, and powerhouse coal ash. In 1974, the State required closure of the disposal area along with ground water monitoring. The Record of Decision addresses control of the source area, as well as monitoring of ground water. The primary contaminants of concern affecting the waste, soil, and/or ground water are VOCs, including benzene, toluene and xylenes; other organics including PAHs; and metals including arsenic, lead, and chromium.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Benzene, Toluene, Excavation, National government, State government, Cost analysis, Metals, Polycyclic aromatic hydrocarbons, *Superfund, First Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *LaPrairie Township(Wisconsin).

PB91-921453/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 5): Pristine, Inc., Reading, OH. (First Remedial Action), March 1990. (Amendment). Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Mar 90, 27p EPA/ROD/R05-90/132
See also PB89-128326.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 2-acre Pristine site is in Reading, Hamilton County, Ohio. The site is bordered by industrial and residential areas, including a trailer park three hundred feet northeast of the site. In 1979, State investigations identified as many as 8,000 to 10,000 drums and several thousand gallons of liquid wastes onsite. Types of waste included acids, solvents, pesticides, and PCBs. From 1980 to 1983, EPA and Pristine removed onsite wastes including paint and solvent sludge, solvents, pesticides, organics, PCB-contaminated soil, and incinerator ash. The ROD amends the soil component remedy of the 1987 ROD from in-situ vitrification to incineration and soil vapor extraction. The primary contaminants of concern affecting the soil, sediment, debris, and ground water are VOCs including benzene, PCE, TCE, and xylenes; other organics including dioxin and pesticides such as DDT; metals including lead, chromium, and arsenic; and other inorganics.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Soils, Refuse, Pesticides, National government, State government, Cost analysis, Pesticides, Benzene, Polychlorinated ethylene, Xylenes, Dioxin, Polychlorinated biphenyls, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, Hamilton County(Ohio).

PB91-921454/REB PC **A02**/MF **A01**
Superfund Record of Decision (EPA Region 5): K and L Landfill, Kalamazoo, MI. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 125p EPA/ROD/R05-90/133
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 87-acre K and L Landfill site is an inactive municipal landfill in Oshtemo Township, Kalamazoo County, Michigan. Surrounding land use is rural-residential with several nearby small lakes and ponds. The site overlies two sand and gravel aquifers (shallow and deep), which are not apparently hydraulically connected, but both are area drinking water sources. In 1979, the State ordered the landfill to cease operations, to supply an alternate water supply to affected residents, and to cover the landfill. The Record of Decision provides a final remedy and addresses contaminated ground water in the shallow aquifer. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including benzene, toluene, and xylenes; other organics including acids, PAHs, PCBs, and phenols; and metals including chromium and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Earth fills, Benzene, Aquifers, National government, State government, Cost analysis, Toluene, Xylenes, Phenols, Metals, Polychlorinated biphenyls, *Superfund, Record of Decision, Remedial action, *Cleanup, Volatile organic compounds, Oshtemo township(Michigan), Kalamazoo County(Michigan).

PB91-921455/REB PC **A05**/MF **A02**
Superfund Record of Decision (EPA Region 5): Ott/Story/Cordova Chemical Site, North Muskegon, MI. (Second Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Sep 90, 98p EPA/ROD/R05-90/135
See also PB90-138405.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Ott/Story/Cordova Chemical site is a former specialty chemical manufacturing facility in Dalton Township, Muskegon County, Michigan. Chemical products manufactured onsite included intermediate items used in manufacturing pharmaceuticals, dyestuffs, agricultural chemicals, diisocyanates, and herbicides. In 1977, the State negotiated with a new site owner to remove several thousand drums, thousands of cubic yards of lagoon sludges, and to destroy or to neutralize phosgene gas left onsite. In 1982, an alternate water supply was undertaken and financed in part by the State and a former owner. The ROD addresses aquifer restoration. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, TCE, toluene, vinyl chloride, and xylenes; other organics including 1,2 dichloroethane and pesticides; and metals including arsenic.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Pesticides, Metals, Excavation, National government, State government, Cost analysis, Benzene, Polychlorinated ethylene, Toluene, Xylenes, Arsenic, *Superfund, Record of Decision, Second Remedial Action, *Cleanup, Volatile organic compounds, *Dalton Township(Michigan), Muskegon County(Michigan).

PB91-921456/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 5): Naval Industrial Reserve Ordnance Plant, Fridley, MN. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 58p EPA/ROD/R05-90/136
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 82.6-acre Naval Industrial Reserve Ordnance Plant (NIROP) site is a weapons system manufacturing facility in Fridley, Minnesota, which began operations in 1940. The site is a government-owned, contractor-operated, plant located just north of the FMC Corp. During the 1970s, paint sludge and chlorinated solvents were disposed of onsite in pits and trenches. In 1981, State investigations identified TCE in onsite water supply wells drawing from the Prairie DuChien/Jordan aquifer, and the wells were shut down. In 1983, EPA found drummed waste in the trenches or pits at the northern portion of the site, and as a result, during 1983 and 1984, the Navy authorized an installation restoration program, during which approximately 1,200 cubic yards of contaminated soil and 42 drums were excavated and landfilled offsite. The Record of Decision (ROD) addresses the remediation of a shallow ground water operable unit. The primary contaminants of concern affecting the ground water are VOCs including PCE, TCE, toluene, and xylene.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Military facilities, Weapons, Excavation, National government, State government, Cost analysis, Xylenes, Toluene, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Fridley(Minnesota), Ethylene/trichloro, Ethylene/chloro.

PB91-921457/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 5): National Presto Industries, Eau Claire, WI. (First Remedial Action), August 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1 Aug 90, 88p EPA/ROD/R05-90/138
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 325-acre National Presto Industries site is a former munitions and metal-working facility in Eau Claire, Chippewa County, Wisconsin, adjacent to the town of Hallie. From 1942 until 1945, the site was government-owned, contractor-operated, and produced gunpowder and small arms. From 1945 to 1980, the site was owned by National Presto, which generated waste streams consisting of metals, oils, grease, and spent solvents. Also, beginning in 1951, artillery shell fuses, aircraft parts, and metal projectiles were produced by NPI under a military contract. The Record of Decision (ROD) provides for a permanent alternate water supply to address the principal threat posed by the ground water contamination at the site. The primary contaminants of concern affecting the ground water include VOCs such as PCE and TCE.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Munitions, Pits(Excavations), National government, State government, Cost analysis, Metal working, Solvents, Water wells, *Superfund, Record of Decision, Fourth Remedial Action, *Cleanup, Volatile organic compounds, *Riverside County(California), Ethylene/chloro, Ethylene/trichloro.

PB91-921458/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 5): St. Louis River/Interlake/Duluth Tar Site, Duluth, MN. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 58p EPA/ROD/R05-90/139
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 230-acre St. Louis River site (also known as the St. Louis River/Interlake Duluth Tar site) is on the north bank of the St. Louis River in Duluth, Minnesota, with portions of the site within the 100-year floodplain. This site is the former location of several pig iron and coking plants, as well as separate tar and chemical companies, which used byproducts from the plants. Soil and underlying ground water are contaminated with high levels of PAHs as a result of past onsite disposal activities. The Record of Decision (ROD) addresses Operable Unit 1 (OU1), the remediation of the onsite tar seeps, which are a potential source of ground water and surface water contamination. The primary contaminants of concern affecting the soil are organics including PAHs.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Soils, Tars, Excavation, National government, State government, Cost analysis, Polycyclic aromatic hydrocarbons, Saint Louis River, Pig iron, Surface waters, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Duluth(Minnesota).

PB91-921459/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 5): Clare Water Supply, Clare County, MI. (First Remedial Action), August 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Aug 90, 21p EPA/ROD/R05-90/140
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Clare Water Supply site is the public water supply system for the city of Clare, Clare County, Michigan. The Clare Water Supply system withdraws ground water from four municipal wells (MW) in the site wellfield, each tapping an unconsolidated sand aquifer. In 1981, ground water sampling revealed contaminants including chlorinated hydrocarbons in two of the wells. Soil samples extracted from this industrial area indicate soil contaminated with TCE and DCE. EPA's study determined that the major source of ground water contamination resulted from contaminants leaching out of soil on the industrial properties, entering a shallow perched aquifer. The first, Operable Unit One (OU1), an interim remedy addressing TCE contamination of the drinking water supply, will be implemented in this Record of Decision (ROD). A subsequent ROD will address OU2, the remaining ground water contaminants as well as soil contamination. The primary contaminants of concern affecting the ground water are VOCs including TCE.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Chlorohydrocarbons, Solvents, Excavation, National government,

State government, Cost analysis, Water wells, Soils, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Clare County(Michigan), Ethylene/trichloro.

PB91-921460/REB PC **A07**/MF **A02**
Superfund Record of Decision (EPA Region 5): University of Minnesota Rosemount Research Center, MN. (First Remedial Action), June 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
11 Jun 90, 139p EPA/ROD/R05-90/141
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The University of Minnesota site, composed of four subsites, is in Rosemount, Dakota County, Minnesota, approximately 20 miles southeast of the Minneapolis/St. Paul metropolitan area. Surrounding land use is agricultural and rural residential. The site is underlain by a shallow sand and gravel aquifer and a deeper fractured dolomite and sandstone aquifer. All three subsites were involved with the storage and/or reconditioning of electrical equipment and contain PCB-contaminated soil and debris from spills or disposal of PCB oil. In 1984, ground water sampling identified the burn pit as a source of contamination. This action has been updated and is addressed in this Record of Decision (ROD). This ROD also addresses ground water treatment in the burn pit area and treatment and consolidation of contaminated soil and debris in the remaining three subsites. The primary contaminants of concern affecting the soil, debris, and ground water include VOCs, including chloroform; other organics including PCBs; and metals such as lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Soils, Metals, Excavation, National government, State government, Cost analysis, Lead(Metal), Water supply, Chloroform, Lead(Metal), *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, *Dakota County(Minnesota).

PB91-921461/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 5): Moss-American Kerr-McGee Oil Site, Milwaukee, WI. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 107p EPA/ROD/R05-90/142
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 88-acre Moss-American Kerr-McGee Oil site, a former wood preserving facility, is in Milwaukee, Milwaukee County, Wisconsin. The Little Menomonee River, which flows through the facility, lies within the 100-year floodplain and is included as part of the site. A section of the site is wooded, and wetlands are located near the river. Beginning in 1921, operations consisted of wood preserving of railroad ties, poles, and fence posts with a mixture of creosote, which is high in PAHs, and No. 6 fuel oil. In 1973, EPA dredged 5,000 feet of the river directly downstream of the site. During 1977 to 1978, 450 cubic yards of contaminated soil were removed. The Record of Decision (ROD) addresses source and ground water remediation. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, toluene, and xylenes; and other organics including PAHs.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Wood preservatives, Benzene, Excavation, National government, State government, Cost analysis, Soils, Toluene, Xylenes, Aromatic polycyclic hydrocarbons, Creosote, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, *Milwaukee(Wisconsin).

PB91-921462/REB PC **A07**/MF **A02**
Superfund Record of Decision (EPA Region 5): Springfield Township Dump Site, Oakland County, MI. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Sep 90, 146p EPA/ROD/R05-90/143
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 16-acre Springfield Township Dump site is in Davisburg, Springfield Township, Michigan. The site is comprised of an open field area surrounded by dense woods. Surrounding land use is mixed agricultural and residential. The site overlies both a shallow and deep aquifer, and there are several wetlands adjacent to the site. Unknown quantities of industrial waste were drained into onsite excavated pits in a central disposal area or deposited on low ground areas. Random dumping of refuse occurred onsite, and many drums containing liquid wastes were seen scattered throughout the woods. In 1978, the State identified PCBs, paint sludge, solvents, oils, and greases in 1,500 onsite drums. From 1979 to 1980, 711 tons of contaminated soil were excavated and removed from several onsite areas including the centrally located disposal pits. The Record of Decision (ROD) addresses remediation of onsite contaminated soil and ground water and will be a final remedy for the site. The primary contaminants of concern affecting the soil and ground water are VOCs including TCE and toluene; other organics including PCBs; and metals including arsenic, chromium, and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Chlorine organic compounds, Biphenyl, Pits(Excavations), National government, State government, Cost analysis, Refuse, Paints, Solvents, Toluene, Metals, Arsenic, Soils, Chromium, Lead(Metal), *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Springfield Township(Maine), Ethylene/Trichloro.

PB91-921463/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 5): Metamora Landfill, Metamora, Lapeer County, MI. (Second Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 65p EPA/ROD/R05-90/144
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 160-acre Metamora Landfill site is an inactive, privately owned landfill in Metamora Township, Lapeer County, Michigan. Both wetland and woodland areas are present onsite. Landfill operations began in 1955 as an open dump, and the facility was upgraded in 1969. Industrial and municipal wastes, including approximately 35,000 drums, were accepted until the landfill closed in 1980. In 1981, the State sampled seven drums and identified several hazardous materials. A 1986 Record of Decision (ROD) for Operable Unit 1 (OU1) called for the excavation and disposal of the waste drums offsite at a RCRA incinerator. The ROD addresses ground water contimination of the shallow aquifer, as well as the generation of leachate at the landfill (OU2). The primary contaminants of concern in the landfill affecting debris and ground water are VOCs including benzene, PCE, TCE, and xylenes; and metals including arsenic and barium.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Benzene, Xylenes, Excavation, National government, State government, Cost analysis, Metals, Arsenic, Incinerators, Barium, *Superfund, Record of Decision, Second Remedial Action, *Cleanup, Volatile organic compounds, *Lapeer County(Michigan), Ethylene/Trichloro,Ethylene/chloro.

PB91-921464/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 5): Hunts Disposal Landfill Site, Town of Caledonia, WI. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Sep 90, 82p EPA/ROD/R05-90/148
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 84-acre Hunts Disposal site is an inactive landfill in Caledonia Township, Racine County, Wisconsin. Onsite features include a 35-acre landfill surrounded by woodlands, wetlands, agricultural areas, and a lake. Part of the site that includes the landfill is within the 100-year floodplain of the Root River. The site overlies a contaminated surficial sand and gravel aquifer. By 1961, municipal and industrial wastes were dumped and burned in an onsite open pit. Specific wastes disposed of onsite included waste newspaper ink, spent solvents, tannery wastes, chromic acids, arsenic acid, and beryllium. The Record of Decision (ROD) addresses both source control and management of contaminant migration. The primary contaminants of concern affecting the soil, sediment, debris, and ground water are VOCs including benzene, TCE, and xylenes; acids; and metals including arsenic and chromium.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Earth fills, Solvents, Excavation, National government, State government, Cost analysis, Root River, Tanning materials, Arsenic, Berillium, Debris, Benzene, Xylenes, Metals, *Superfund, Record of Decision, Remedial Action, *Cleanup, Volatile organic compounds, *Caledonia Township(Wisconsin), Ethylene/Trichloro.

PB91-921465/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 5): Union Scrap Iron Metal, Hennepin County, Minneapolis, MN. (First Remedial Action), March 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Mar 90, 31p EPA/ROD/R05-90/149
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Union Scrap Iron Metal site is a vacant industrial property in Minneapolis, Hennepin County, Minnesota. The site overlies an alluvial aquifer. Surrounding land use is primarily industrial and commercial, with adjacent residential areas. From the early 1970s until 1983, the site was used as a processing facility for used batteries and scrap metal. In 1987, a potentially responsible party removed 773 tons of battery casing material from the site. Two subsequent EPA removal actions in 1988 included the excavation and offsite disposal of onsite contaminated soil. A 1989 to 1990 remedial investigation determined that prior removal actions were effective in eliminating contaminated onsite soil and waste, and the low level ground water contamination does not pose any threat to public health. There are no contaminants of concern affecting the site.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Aquifers, Batteries, Excavation, National government, State government, Cost analysis, Metals, Soils, Removal, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, *Hennepin County(Minnesota).

PB91-921466/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 5): Bofors-Nobel Site, Muskegon, MI. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
17 Sep 90, 77p EPA/ROD/R05-90/150
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 85-acre Bofors Nobel site is an active specialty chemical production plant in Edelston Township, Muskegon County, Michigan. An inactive landfill is also located in the eastern portion of the site. Onsite wetlands lie within the floodplain of Big Black Creek, which runs through the southern portion of the site. The site overlies a lacustrine aquifer, a potential drinking water source, which has been contaminated as a result of site activities. During the 1960s and early 1970s, sludge, wastewater, and waste liquids from plant operations were discharged into 10 onsite lagoons. The Record of Decision (ROD) addresses remediation of the lagoons, as well as upgrading the current ground water treatment system. A subsequent final ROD will address other contaminated soil and complete restoration of the aquifer. The primary contaminants of concern affecting the soil, sludge, and ground water are VOCs including benzene.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Chemical industry, Water treatment, Excavation, National government, State government, Cost analysis, Lagoons(Ponds), Sails, Sludge disposal, Benzene, Monitoring, Earth fills, *Superfund, Record of Decision, Remedial action, *Cleanup, Volatile organic compounds, *Muskegon County(Michigan), Edelston Township(Michigan).

PB91-921467/REB PC **A09**/MF **A02**
Superfund Record of Decision (EPA Region 6): Jacksonville Municipal Landfill Superfund Site, AR. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 182p EPA/ROD/R06-90/055
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 80-acre Jacksonville Municipal Landfill site is an inactive landfill outside the city limits of Jacksonville, Lonoke County, Arkansas, in a floodplain area. Neighboring the site are the Rogers Road Municipal Landfill and the Vertac Chemical Superfund sites. The Record of Decision (ROD) addresses the drummed waste, soil, and loose debris, and their offsite disposal at the Vertac facility. The primary contaminants of concern affecting the soil and debris, are organics including pesticides, such as dioxin.

Keywords: *Waste disposal, *Pollution control, *Earth fills, Decontamination, Hazardous materials, Soils, Pesticides, Dioxin, Arkansas, *Superfund, *Remedial action, Record of Decision, Lonoke County(Arkansas), Jacksonville Municipal Landfill.

PB91-921468/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 6): Texarkana Wood Preserving Company, Texarkana, Bowie County, TX. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
25 Sep 90, 78p EPA/ROD/R06-90/057
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 25-acre Texarkana Wood Preserving site is a former wood treating facility in Bowie County, Texas, within the Days Creek 100-year floodplain. Surrounding land use is industrial, residential, and agricultural. Since the early 1900s, several lumber-related businesses have operated at the site, with documented creosote-based wood treating operations starting in 1954. By 1971, Texarkana was also using creosote and pentachlorophenol for wood preserving. State investigations of the site between 1968 and 1984, showed Texarkana to be negligent or delinquent in fulfilling various permit requirements. The Record of Decision (ROD) addresses onsite contaminated soil near the processing ponds and contaminated ground water in a shallow aquifer. The primary contaminants of concern affecting the soil, sediment, sludge, and ground water are organics including dioxin, PAHs, pesticides, and phenols.

Keywords: *Waste disposal, *Lagoons(Ponds), *Pollution control, Decontamination, Hazardous materials, Water pollution, Wood preservatives, Phenols, Pesticides, Ground water, Days Creek, Soils, Texas, *Superfund, *Remedial action, Texarkana Wood Preserving, Bowie County(Texas), Record of Decision.

PB91-921469/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 6): Tenth Street Dump/Junkyard, Oklahoma City, OK. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 79p EPA/ROD/R06-90/059
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 3.5-acre Tenth Street Dump/Junkyard site is an inactive landfill in Oklahoma City, Oklahoma, within the North Canadian River's 100-year floodplain. From 1951 to 1979, the site was used, in succession, as a municipal landfill, a privately owned and operated salvage yard, and an automobile salvage yard. Waste materials accepted by the first salvage yard included paint thinners, old transformers, and tires. Dielectric fluid that contained PCBs was drained from old transformers, stored in barrels, and sold. In 1983, EPA site inspections located 20 drums, some of which were corroded and leaking contaminated material into the soil. In 1985, EPA completed removal actions. The Record of Decision addresses soil contamination at the site. It is estimated that 8,500 cubic yards of soil are contaminated by PCBs, with 7,500 cubic yards of the total having PCBs levels above the TSCA PCB spill cleanup policy level of 25 mg/kg. The primary contaminants of concern affecting the soil are organics including PCBs.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Earth fills, Sites, Describing, Industrial wastes, Volume, Contaminants, Tires, Transformers, Excavation, National government, State government, Cost analysis, Soils, Dechlorination, Waste treatment, Activated carbon process, Adsorption, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, Polychlorinated biphenyls, *Oklahoma City(Oklahoma).

PB91-921470/REB PC **A08**/MF **A02**
Superfund Record of Decision (EPA Region 6): Tinker AFB (Soldier Creek/Bldg. 3001), OK. (First Remedial Action), August 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
16 Aug 90, 157p EPA/ROD/R06-90/061
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 220-acre Tinker AFB (Soldier Creek/Building 3001) site, which includes an active military facility and the adjacent Soldier Creek is in Oklahoma City, Oklahoma. Surrounding land use is urban residential. Underlying the site is a surficial perched aquifer and a sole-source aquifer for the region. The Building 3001 (B3001) facility is used as an aircraft overhaul and modification complex for jet engine service, repair, and upgrades. From the 1940s to the 1970s, organic solvents were used to degrease metal parts in subsurface pits. Ground water contamination has occurred onsite as a result of seepage from these pits, direct discharge of solvents to storm drains, spills, and faulty drainage system connections. A North Tank Area contains several active and abandoned underground waste oil and fuel tanks. Contamination in the area has resulted from leaking tanks and fuel spills directly onto the ground. In addition, there is onsite Volatile Organic Compounds contamination, which may be the result of leaking utility lines in the area. Investigations by the Air Force from 1982 to 1989, documented ground water contamination under the B3001 complex; the potential threat of further contamination from Pit Q-51, one of the former degreasing pits; and leakage of underground storage tanks in the North Tank Area. The Record of Decision (ROD) addresses remediation of onsite ground water, along with remedial actions relating to Pit Q-51 and the North Tank Area. The primary contaminants of concern affecting the soil, debris and ground water are Volatile Organic Compounds including benzene, PCE, TCE, toluene, and xylenes; other organics including phenols; and metals including chromium and lead.

Keywords: *Waste disposal, *Pollution control, *Pits(Excavations), Decontamination, Hazardous materials, Water pollution, Aquifers, Groundwater, Benzene, Toluene, Xylenes, Phenols, Metals, Fuel, Oklahoma, *Superfund, *Remedial action, Tinker Air Force Base, Soldier Creek Building 3001, Oklahoma City(Oklahoma), Record of Decision.

PB91-921471/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 7): Northwestern States Portland Cement Company Site, Mason City, IA. (First Remedial Action), June 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
26 Jun 90, 39p EPA/ROD/R07-90/033
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Northwestern States Portland Cement site, a cement manufacturing facility, is in Mason City, Cerro Gordo County, Iowa. Calmus Creek flows between the Northwestern States Portland Cement Company (NWSPCC) facility and another cement manufacturing plant facility located just north of the site. The site includes a 150-acre area named the West Quarry where NWSPCC disposed of 2 million tons of waste cement kiln dust from 1969 to 1985. Local ground water and surface water have been impacted by elevated pH levels as a result of waste cement kiln dust disposal in the West Quarry. The Record of Decision addresses the contamination source, the cement kiln dust disposed of in the West Quarry, and the resulting ground water and surface water contamination. The primary contaminants of concern affecting the ground water and surface water are organics including phenols; metals including chromium and lead; and other inorganics including waste cement kiln dust.

Keywords: *Waste disposal, *Pollution control, *Ponds, Decontamination, Hazardous materials, Calmus Creek, Ground water, Water pollution, Phenols, Metals, Iowa, *Superfund, *Remedial action, Northwestern State Portland Cement, Mason City(Iowa), Cerro Gordon County(Iowa), Waste cement kiln dust, Record of Decision.

PB91-921472/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination (East Industrial Park), NE (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 120p EPA/ROD/R07-90/034
See also PB90-157751 and PB89-182471.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (Minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Hastings Ground Water Contamination site is a contaminated aquifer in and near the city of Hastings, Adams County, Nebraska. The site consists of seven source areas, or subsites, contaminated with industrial chemicals. The Record of Decision (ROD) addresses contaminated surface soil (1-10 feet) on approximately 14 acres of the 2,600-acre Hastings East Industrial Park subsite. The subsite is on a portion of the former Hastings Naval Ammunition Depot (NAD). Investigations have detected three major types of contaminants in onsite soil, including explosives such as trinitrotoluene (TNT), carcinogenic and noncarcinogenic polynuclear aromatic hydrocarbons (PAHs) and metals. The remedy is designed to control the migration of contaminants from surface soil to the underlying aquifer. The primary contaminants of concern affecting the soil are organics including PAHs; metals including arsenic, chromium, and lead; and TNT.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Carcinogens, Soils, Aquifers, Arsenic, Chromium, Lead, Metals, Trinitrotoluene, Water pollution, Nebraska, *Superfund, *Remedial action, Hastings(Nebraska), Adams County(Nebraska), Hastings East Industrial Park, Record of Decision.

PB91-921473/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination FAR-MAR-CO Subsite, Hastings Irrigation Pipe Company TCA Soils Operable Unit, Hastings, NE. (Second Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 26p EPA/ROD/R07-90/035
See also PB89-182463.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Hastings Ground Water Contamination site (FAR-MAR-CO) is a contaminated aquifer in and near the city of Hastings, Adams County, Nebraska. The site consists of seven source areas, or subsites, contaminated with volatile industrial chemicals. The Record of Decision (ROD) addresses the Zone 2 portion of the FAR-MAR-CO subsite, which has been divided into two general areas of contamination referred to as Zone 1 and Zone 2. Zone 1, which includes grain elevators and areas to the north of the elevators, contains soil, soil-gas, and ground water contaminated with ethylene dibromide and carbon tetrachloride. Zone 1 contamination was addressed in a 1988 ROD. Zone 2, which is owned and operated by the Hastings Irrigation Pipe Company contains soil contamination primarily due to 1,1,1-trichloroethane (TCA) resulting from the disposal of cleaning solvents in Zone 2. Subsequent testing revealed that the concentration of TCA in Zone 2 had been reduced to a protective level. Response actions for ground water contamination near the FAR MAR CO subsite, however, will be addressed in subsequent remedial activities.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Aquifers, Carbon tetrachloride, National government, State government, Cost analysis, Solvents, Monitoring, Soils, Methane, *Superfund, Record of Decision, Second Remedial Action, *Cleanup, Volatile organic compounds, *Adams County(Nebraska), Ethylene dibromide.

PB91-921474/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 7): Lindsay Manufacturing Company, Lindsay, NE. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 70p EPA/ROD/R07-90/036
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 42-acre Lindsay Manufacturing site is an irrigation sprinkler manufacturing facility in Lindsay, Platte County, Nebraska. The site is in a topographic low created by Shell Creek, a USDA-designated wetland. Sprinkler manufacturing operations began in 1958, and until 1982, 10,000 to 15,000 gallons of spent acid from a galvanizing process was piped monthly to an earthen unlined disposal pit. Test wells for the 1982 treatment facility construction showed acid contamination of ground water. Investigations from 1987-1989 revealed soil and ground water contamination by organics and metals throughout the site. The ROD addresses both the remediation of soil source areas and the enhancement of the ground water treatment. The primary contaminants of concern affecting the soil and ground water are VOCs, including PCE; and metals including chromium and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Metals, Chromium, Excavation, National government, State government, Cost analysis, Soils, Lead(Metal), Water treatment, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, *Platt County(Nebraska).

PB91-921475/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 7): Midwest Manufacturing/North Farm Site, Midwest Operable Unit, Kellogg, IA. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 77p EPA/ROD/R07-90/037
See also PB89-188726.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 8-acre Midwest Manufacturing/North Farm site is located on a manufacturing site owned and operated by Smith-Jones, Inc. in Kellog, Iowa. From 1973 to 1981, Smith-Jones engaged in electroplating and painting operations of manufactured products, which involved the use of TCE to clean the product before it was coated with the metal. In 1977, the State required treatment of the wastewaters to precipitate metals. Site inspections in the early 1980s, by EPA revealed elevated heavy metal concentrations. Ground water sampling revealed contamination of the alluvial aquifer underlying the site. The ROD addresses both source control and ground water remediation at the site. The primary contaminants are VOCs, including PCE, TCE, toluene, and xylenes; and metals, including chromium, and lead. The selected remedial action for the site includes installing a low permeability cap over the waste disposal cell in accordance with RCRA landfill closure requirements; treating ground water using air stripping, and possible treatment of vapor/air mixture using carbon adsorption, and filtering water to remove inorganics, if needed; discharging the treated water onsite to the Skunk River or offsite to a publicly owned treatment works (POTW); implementing institutional controls including deed and ground water use restrictions; and ground water monitoring for 30 years.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Metals, Chromium, Excavation, National government, State government, Cost analysis, Toluene, Lead(Metal), Capping, Fluid infiltration, Waste treatment, Activated carbon treatment, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, *Kellog(Iowa), Air stripping.

PB91-921476/REB PC **A05**/MF **A02**
Superfund Record of Decision (EPA Region 7): Missouri Electric Works Site, Cape Girardeau, MO. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 97p EPA/ROD/R07-90/038
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 6.4-acre Missouri Electric Works (MEW) site is an electrical equipment sales, service, and remanufacturing operation in Cape Girardeau, Missouri. Intermittent onsite runoff channels flow into Cape LaCroix Creek located 0.7 miles east of the site, which enters the Mississippi River, 1.1 miles to the southeast. The MEW property, as well as adjacent properties, have been contaminated with PCBs as the result of inadequate storage and handling of transformers and PCB-contaminated transformer oils. In addition, spills and disposal of industrial spent solvents occured onsite affecting ground water underlying site. The Record of Decision (ROD) addresses both contaminated soil and sediment removal, as well as the treatment of affected ground water. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, PCE, and TCE; and organics including PCBs.

Keywords: *Industrial waste, *Pollution control, *Transformers, Waste disposal, Decontamination, Hazardous materials, Water pollution, Ground water, Benzene, Cape LaCroix Creek, Missouri, *Superfund, *Remedial action, Record of Decision, Cape Girardeau(Missouri), Missouri Electric Works, Polychlorinated biphenyls.

PB91-921477/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 7): Waverly Ground Water Contamination Site, Waverly, NE. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
26 Sep 90, 41p EPA/ROD/R07-90/039
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Waverly Ground Water Contamination site is in Waverly, Lancaster County, Nebraska. At this municipally owned site, the ground water aquifer provides 100 percent of the drinking water for the community of approximately 2,000 people through the municipal water system. Between 1952 and 1974, a Federal grain facility, located on a portion of the site, was the source of ground water contamination. From 1955 to 1965, the fumigant 80/20, composed of 80 percent carbon tetrachloride and 20 percent carbon disulfide, was used onsite on stored grain. The contaminants of concern affecting the soil and ground water are VOCs including carbon tetrachloride and chloroform. The selected remedial action for the site includes continued operation and maintenance of the ground water air stripping system and the soil vapor extraction system; ground water monitoring to delineate the magnitude and extent of contamination; evaluation of the construction of PWS 3 to explain the contamination in the well; sampling existing and new monitoring wells; development of a ground water flow and transport model to determine the correct pumping rate for the existing ground water extraction well, and investigation of the potential uses for the treated water discharged offsite.

Keywords: *Pollution control, *Grain elevators, Decontamination, Hazardous materials, Ground water, Water pollution, Aquifers, Pesticides, Carbon tetrachloride, Chloroform, Nebraska, *Superfund, *Remedial action, Waverly(Nebraska), Lancaster County(Nebraska), Record of Decision, Waverly Ground Water Contamination Site.

PB91-921478/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 7): Fairfield Coal Gasification Site, Fairfield, IA. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
21 Sep 90, 82p EPA/ROD/R07-90/041
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 1.3-acre Fairfield Coal Gasification Plant is a former coal gas generator plant in the town of Fairfield, Jefferson County, Iowa. From 1878 to 1950, gas was generated from coal as an energy source using various processes, each producing an array of by-products that were either sold or disposed of onsite. In 1986, site investigations by the power company found evidence of surface contamination and contamination in the underlying ground water as a result of leaching from buried coal tar wastes. The source of contamination was determined to be the sediments and soil. The primary contaminants of concern affecting the soil, sediment, and ground water are VOCs including benzene, toluene, and xylenes; other organics including PAHs; and metals including arsenic, chromium, and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Coal gasification, Coal gas, Aromatic polycyclic hydrocarbons, National government, State government, Cost analysis, Coal tar, Ammonium, Benzene, Toluene, Metals, Soils, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, *Fairfield(Iowa), Xylenes.

PB91-921479/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 8): Sand Creek Industrial Site, Commerce City, CO. (Second Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

28 Sep 90, 96p EPA/ROD/R08-90/031
See also PB90-178864.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Sand Creek Industrial site is chemical manufacturing facility in Commerce City, Adams County, Colorado. Land use in the area surrounding the site is primarily industrial and residential with 13 residents onsite. Production wells north and downgradient of the site supply drinking water to the county. Beginning in the 1960s, the Colorado Organic Chemical Company (COC) conducted pesticide manufacturing operations onsite. Disposal and onsite storage areas include a landfill and acid pits. Onsite fires in 1968 and 1977, as well as improper pesticide storage practices, resulted in pesticide-contaminated soil, ground water, and surface water. A 1989 Record of Decision (ROD) addressed OU1, which included remediating some of the subsurface soil. This second ROD addresses OU5, and includes the final response action for the 14,000 cubic yards of contaminated soil present onsite at the COC area. The primary contaminants of concern affecting the soil are organics including pesticides; and metals including arsenic and chromium.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Chemical industry, Excavation, National government, State government, Cost analysis, Soils, Metals, Arsenic, Chromium, Pesticides, *Superfund, Record of Decision, Second Remedial Action, *Cleanup, Volatile organic compounds, *Commerce City(Colorado), Adams County(Colorado).

PB91-921480/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 8): Ogden Defense Depot (Operable Unit 2), Weber County, Ogden, UT. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 58p EPA/ROD/R08-90/032
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 1,100-acre Ogden Defense Depot site is an active military facility in Ogden, Weber County, Utah. Land use in the surrounding area is mixed residential and commercial. The site overlies a shallow unconsolidated lacustrine and alluvial aquifer. Oily liquid materials and combustible solvents were burned in onsite pits, and solid materials were buried onsite. The Record of Decision (ROD) addresses OU2. From the early 1970s until 1985, the 8.5 by 20-foot french drain area, which is comprised of a 2.5 to 4-foot deep gravel-filled excavation, was used as a loading and mixing area for pesticides and herbicides, and for rinsing the empty containers. The ROD addresses soil at the french drain area and onsite ground water contamination.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Military facilities, Pesticides, Excavation, National government, State government, Cost analysis, Solvents, Oils, Paints, Soils, Benzene, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Ogden(Utah), Weber County(Utah).

PB91-921481/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 8): Mystery Bridge at Highway 20, Natrona County, WY. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
24 Sep 90, 109p EPA/ROD/R08-90/033
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Mystery Bridge at Highway 20 site is an industrial area with two onsite residential subdivisions, in Natrona County, one mile east of Evansville, Wyoming. A portion of the site lies within the 100- and 500-year floodplains of the North Platte River and Elkhorn Creek. Two plants are located at the site: the DOW/DSI facility, an oil and gas production enhancement service facility; and the KN plant, which is a natural gas fractionation, compression, cleaning, odorizing and transmission plant. The site overlies a contaminated alluvial aquifer. In 1965, an underground pipe burst, releasing 5,000 to 10,000 gallons of absorption oil from the KN facility into the soil. From 1965 to 1987, a flare pit was used by KN to collect spent materials and wastes, and an onsite catchment area was used to collect the contaminated surface runoff etc. In 1987, site investigations revealed the presence of aromatic hydrocarbons in the soil in this area. The Record of Decision (ROD) addresses remediation of the onsite ground water emanating from the DOW/DSI and KN facilities; the VHO and BETX plumes respectively. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Benzene, Toluene, Excavation, National government, State government, Cost analysis, Xylenes, Hydrocarbons, Gas production, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Natrona County(Wyoming), Ethylene/trichloro, Ethylene/chloro.

PB91-921482/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 8): Monticello Mill Tailings Site, San Juan County, UT. (First Remedial Action), August 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
22 Aug 90, 83p EPA/ROD/R08-90/034
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 300-acre Monticello Mill Tailings site is comprised of a 78-acre inactive uranium and vanadium milling operation and affected peripheral properties in Monticello, San Juan County, Utah. Surrounding land use is rural residential and agricultural. Milling of ore began in 1942, and a vanadium/uranium sludge product was produced onsite from 1943 to 1944. The mill was permanently closed in 1960, and the tailings piles were covered and vegetated. In 1972, 15,000 cubic yards of contaminated soil were excavated and disposed of on the onsite tailings piles. Site investigations from 1989 to 1990 identified the presence of onsite and offsite radioactively-contaminated soil and ground water, and elevated concentrations of metals within the tailings piles. The Record of Decision (ROD)addresses remediation of two Operable Units (OUs): the 78-acre Millsite area (OU1), and the 240-acres of peripheral properties (OU2). The primary contaminants of concern affecting the soil and debris are metals including arsenic, chromium, and lead; and radioactive materials including radium-226 and radon.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Radium 226, Soils, Radon, National government, State government, Cost analysis, Vanadium, Arsenic, Chromium, Milling(Machining), Aquifers, Lead(Metal), Surface waters, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *San Juan County(Utah).

PB91-921483/REB PC **A08**/MF **A02**
Superfund Record of Decision (EPA Region 8): Martin Marietta Astronautics Group Site, Waterton, CO. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
24 Sep 90, 161p EPA/ROD/R08-90/035
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 5,200-acre Martin Marietta, Denver Aerospace site is in Waterton, Jefferson County, Colorado. The site completely surrounds 464 acres of contaminated Air Force property, which is being addressed as a separate Superfund site. Since 1950, the Martin Marietta Aeronautics Group (MMAG) has been conducting high technology engineering, design, development, and manufacturing operations for the space industry onsite. Types of wastes generated during onsite activities include oils, metals, organic solvents, wastewater, chemical process sludges, and VOCs. From 1959 to 1980, untreated, highly concentrated waste from onsite activities was disposed of in five onsite ponds, referred to as the Inactive Site Ponds Area. Previous site remediations by MMAG from 1969 to 1985 did not address contaminant sources or migration, but included backfilling and regarding of the Rifle Range Landfill. The Record of Decision (ROD) addresses remediation of onsite contaminated soil, waste/debris, and ground water. The primary contaminants of concern are VOCs including TCE; toluene, and xylenes; other organics including PCBs, pesticides, and phenols; and metals including chromium and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Pesticides, Lead(Metal), Excavation, National government, State government, Cost analysis, Toluene, Xylenes, Metals, Phenols, Chromium, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Jefferson County(Colorado), Waterton(Colorado).

PB91-921484/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 16), CO. (Second Remedial Action), February 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
26 Feb 90, 72p EPA/ROD/R08-90/036
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Rocky Mountain Arsenal (RMA) (Operable Unit 16) comprises part of the 17,000-acre RMA site, which is a former U.S. Army chemical warfare and incendiary munitions manufacturing and assembly plant in Adams Count, Colorado. From the 1950s until late 1969, the U.S. Army used the RMA facility to produce the nerve agent GB (isopropyl methyl-phosphonoflu oridate). From 1947 to 1982, private industries leased major portions of the plant facilities to manufacture various insecticides and herbicides. Since 1970, facility operations primarily have involved the destruction of chemical warfare materials. Thirteen Interim Response Actions (IRAs) were determined necessary prior to implementing the final On-Post Record of Decision (ROD). Operable Unit 16 (M-1 Settling Basins area) is one of several areas being addressed as part of the Other Contamination Sources IRA. The ROD addresses interim remediation of source areas and management of contaminant migration. Th e primary contaminants of concern affecting the soil, sludge, and ground water are organics including pesticides, and metals including arsenic.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Sites, Describing, Industrial wastes, Volume, Contaminants, Nerve agents, Military chemical agents, Excavation, National government, State government, Cost analysis, Pesticides, Metals, Arsenic, Soils, Sludge disposal, *Superfund, Record of Decision, Second Remedial Action, *Cleanup, Volatile organic compounds, *Adams County(Colorado).

PB91-921485/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 18), CO. (Third Remedial Action), February 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
26 Feb 90, 76p EPA/ROD/R08-90/038
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Rocky Mountain Arsenal (RMA) (Operable Unit 18) site comprises part of the 17,000-acre RMA site, which is a former U.S. Army chemical warfare and incendiary, munitions manufacturing, and assembly plant in Adams County, Colorado. From the 1950s until late 1969, the U.S. Army used the RMA facility to produce the nerve agent GB (isopropyl methyl- phosphonofluoridate). In addition, between 1947 and 1982, private industries manufactured various insecticides and herbicides. Since 1970, facility operations primarily have involved the destruction of chemical warfare

materials. Thirteen Interim Response Actions (IRAs) were necessary prior to implementing the Final On-post Record of Decision (ROD). The ROD addresses interim remediation of source ares and management of migration. The primary contaminants of concern affecting the soil and ground water are VOCs, including benzene and TCE.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Nerve agents, Pesticides, Phosphorus organic compounds, National government, Cost analysis, Munitions, Storage tanks, Diesel fuels, Gasoline, Incendiary mixtures, Benzene, State government, *Superfund, Record of Decision, Third Remedial Action, *Cleanup, Volatile organic compounds, *Adams County(Colorado), Ethylene/Trichloro, Fluorinated hydrocarbons.

PB91-921486/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 20), CO. (Fifth Remedial Action), March 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
20 Mar 90, 63p EPA/ROD/R08-90/040
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 17,000-acre Rocky Mountain Arsenal (Operable Unit 20) site is a former U.S. Army chemical warfare and incendiary munitions manufacturing and assembly plant in Adams County, Colorado. From the 1950s until late 1969, the U.S. Army used the RMA facility to produce the nerve agent GB (isopropylmethylphosphonofluoridate). From 1947 to 1982, private industries leased major portions of the plant facilities to manufacture various insecticides and herbicides. Thirteen Interim Response Actions (IRAs) were determined necessary prior to implementing the final On-Post Record of Decision (ROD). The primary contaminants of concern affecting the soil, sludge, and ground water are organics including pesticides; and metals including arsenic, chromium, and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Sludge disposal, Nerve agents, Excavation, National government, State government, Cost analysis, Pesticides, Soils, Benzene, Storage tanks, *Superfund, Record of Decision, Fifth Remedial Action, *Cleanup, Volatile organic compounds, *Adams County(Colorado).

PB91-921487/REB PC **A19**/MF **A04**
Superfund Record of Decision (EPA Region 8): Rocky Flats Plant (DOE), Northern Jefferson County, CO. (First Remedial Action), January 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
5 Jan 90, 428p EPA/ROD/R08-90/043
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 6,550-acre Rocky Flats Plant (DOE) site is a federal facility, which serves as a nuclear weapons research development and production complex in Jefferson County, Colorado. Surrounding land use is primarily rural residential, although there are some industrial properties nearby. The site overlies an alluvial/colluvial aquifer, and a small wetlands area is present. Since 1951, onsite operations have included the manufacture of nuclear weapons components from plutonium, uranium, beryllium, and stainless steel. There are twelve sites, designated as solid waste management units, which comprise the 881 Hillside area. In 1987, EPA identified VOC-contaminated ground water in the 881 Hillside area. The Record of Decision (ROD) addresses management of migration and cleanup of ground water in the 881 Hillside area. The primary contaminants of concern affecting the ground water are VOCs including PCE and TCE; metals including chromium; and radioactive materials.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Metals, Chromium, Nuclear weapons, National government, State government, Cost analysis, Metals, Radioactive wastes, Aquifers, Radioactive wastes, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Jefferson County(Colorado), Ethylene/Trichloro, Ethylene/Chloro.

PB91-921488/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 8): Sharon Steel (Midvale Tailings), Midvale, UT. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
24 Sep 90, 118p EPA/ROD/R08-90/044
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Sharon Steel (Midvale Tailings) site is a former ore milling operation facility in Midvale, Utah. Land use in the area is residential, urban, agricultural, and commerical. Onsite and offsite features include a mill site, a tailings area, and an offsite residential community that relies on drinking water supply wells. Tailings from these operations were deposited into onsite uncovered tailings piles, which have an estimated volume of 14,000,000 cubic yards. The State in 1982 identified elevated levels of metals within the tailings piles. It is estimated that over 242,000 cubic yards of soil in the residential community were contaminated by windblown tailings. The Record of Decision (ROD) addresses remediation of offsite soil in the residential areas. The primary contaminants of concern affecting the soil are metals including arsenic, cadmium, and lead.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Soils, Sites, Describing, Industrial wastes, Volume, Contaminants, Metals, Arsenic, National government, State government, Cost analysis, Cadmium, Lead(Metal), Tailings, Milling(Machining), *Superfund, Record of Decision, First Remedial Action, *Cleanup, *Midvale(Utah).

PB91-921489/REB PC **A10**/MF **A03**
Superfund Record of Decision (EPA Region 9): J. H. Baxter Superfund Site, Weed, CA. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 209p EPA/ROD/R09-90/047
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The J.H. Baxter site is in Weed Siskiyou County, north-central California, and consists of the 33-acre J.H. Baxter facility and the adjacent 870-acre Roseburg Forest Products facility. Since 1937, wood treatment operations at the site have involved a variety of chemicals including ammonical copper-zinc-arsenate, creosote, and PCP. The primary contaminants of concern affecting the soil, sediment, ground water, and surface water are organics including PAHs and dioxins; and metals including arsenic.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Wood products, Wood preservatives, Metals, National government, State government, Cost analysis, Surface waters, Creosote, Aromatic polycyclic hydrocarbons, Herbicides, Arsenic, *Superfund, Record of Decision, First Remedial Action-Final, *Cleanup, Volatile organic compounds, *Siskiyou County(California).

PB91-921490/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 9): Stringfellow Hazardous Waste Site, Riverside County, CA. (Fourth Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Sep 90, 44p EPA/ROD/R09-90/048
See also PB88-220934, PB85-214153 and PB85-214138.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Stringfellow site is an inactive hazardous waste disposal facility in Riverside County, California, approximately 50 miles east of Los Angeles. The site is divided into four zones. From 1956 to 1972, approximately 34 million gallons of industrial waste from metal finishing, electroplating, and DDT production were disposed of in unlined evaporation ponds located throughout Zone 1. Some of the wastes from these ponds migrated into the ground water system. In 1980, EPA removed approximately 10 million gallons of contaminated water, reinforced containment barriers, and improved a truck loading area. Further removal actions included installing french drain system fences; removal of all remaining surface liquids; partially neutralizing and capping the wastes; installing a gravel drain network, monitoring wells, and surface channels; and contructing a surface barrier and leachate collection system downgradient from the original evaporation ponds. In 1983, the first Record of Decision (ROD) provided an interim remedial measure and addressed additional fencing of the site and implemented erosion control and offsite disposal of the extracted leachate. The fourth ROD addresses the contaminated ground water in Zone 1 and in Zone 4, and proposes treatability studies to remediate the source material in Zone 1.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Plumes, Metal finishing, Extraction, National government, State government, Cost analysis, Activated carbon treatment, DDT, Insecticides, Fences, Erosion control, Hauling, Dewatering, *Superfund, Record of Decision, Fourth Remedial Action, *Cleanup, Volatile organic compounds, *Stringfellow(California), *Riverside(California), Ethylene.

PB91-921491/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 9): Louisiana-Pacific Corporation, Oroville, CA. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 77p EPA/ROD/R09-90/053
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Louisiana-Pacific (L-P) site is comprised of an active wood processing plant and a landfill in Butte County, Oroville, California. The plant and landfill are 1/2 mile apart, separated by another Superfund site, the Koppers Company site. The plant rests on mine tailings created by dredge mining activities conducted from 1900 until 1969. Since 1970, plant activities have included log storage, and lumber production. In 1973, State investigations discovered PCP and various other contaminants in downgradient ground water and surface water, as well as, sawdust and wood waste at the plant and landfill. The Record of Decision (ROD) documents an interim remedy and the need to collect additional data on arsenic and formaldehyde levels on and near the site. The primary contaminants of concern affecting the soil and ground water are VOCs including toluene; organics including formaldehyde; and metals including arsenic, lead, and zinc.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Earth fills, Mining, Excavation, National government, State government, Cost analysis, Phenols, Tailings, Wood, Surface waters, Fungicides, Toluene, Metals, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Butte County(California), Phenol/Chloro.

PB91-921492/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 9): Applied Materials, Inc., Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 87p EPA/ROD/R09-90/054
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 9-acre Applied Materials site is an active equipment manufacturing facility in Santa Clara, Santa Clara

County, California. The site is located within the San Tomas Aquino floodplain, and land use in the area is primarily light industrial, commercial, and residential. Shallow ground water at the site is a potential drinking water source. In 1984 and 1985, as part of interim onsite cleanup activities, Applied Materials excavated and removed underground tanks, piping, and more than 60 cubic yards of contaminated onsite soil, and installed an air stripping unit onsite to treat VOC-contaminated ground water. The Record of Decision (ROD) provides a final remedy for contaminated onsite ground water at the Building 1 area. The primary contaminants of concern affecting the ground water are VOCs including PCE, TCE, and 1,1,1-TCA.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Soils, Excavation, National government, State government, Cost analysis, Trichloroethylene, Trichloroethanes, Freon, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Santa Clara County(California), Ethylene/trichloro.

PB91-921493/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 9): Operating Industries, Inc., Monterey Park, CA. (Third Remedial Action), September 1990 (Amendment).
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 31p EPA/ROD/R09-90/055
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 190-acre Operating Industries site is an inactive municipal landfill in Monteray Park, California. Surrounding land use is primarily industrial, however, 53,000 residences are located within three miles of the site. Onsite disposal activities began in 1948, and continued until 1984. Wastes accepted at the landfill included household and organic refuse, scrap metal, non-decomposable inert solids, and liquid wastes. Two 1987 Records of Decision (RODs) addressed site control, monitoring, and leachate management. A third ROD, signed in 1988, addressed landfill gas migration control. The ROD amends the original 1988 landfill gas migration control ROD to include the addition of an upgraded landfill cap. The primary contaminants of concern affecting the air are VOCs including benzene, PCE, TCE, and toluene.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Air pollution, Sites, Describing, Industrial wastes, Volume, Contaminants, Benzene, Toluene, National government, State government, Cost analysis, Earth fills, Methane, Refuse, Metals, Liquids, *Superfund, Record of Decision, Third Remedial Action, *Cleanup, Volatile organic compounds, *Monteray Park(California), Leachate, Ethylene/Trichloro.

PB91-921494/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 10): FMC Pesticide Formulation Facility, Yakima, WA. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
14 Sep 90, 54p EPA/ROD/R10-90/024
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The FMC Yakima Pit site is a former pesticide formulation facility in central Yakima County, Washington. The site consists of a 58,000 square foot fenced area on the northeastern portion of a 10-acre property. Pesticide dusts and liquids were manufactured onsite from 1951 to 1986, and between 1952 and 1969 wastes containing pesticides were disposed of in an onsite pit. Beginning in the 1970s, liquid products were formulated onsite, a process that used solvents, emulsifiers and stabilizers. The Record of Decision addresses the contamination that remains in the formulation areas and some contaminated soil in the former disposal pit, including 900 cubic yards of pesticide- and metal-contaminated soil and portions of buildings and other concrete structures that contain high levels of pesticide contamination. The primary contaminants of concern affecting the soil and debris are organics including pesticides and metals including chromium.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, *Ground water, Sites, Describing, Industrial wastes, Volume, Contaminants, Pesticides, Pits(Excavations), Concrete structures, National government, State government, Cost analysis, Solvents, Emulsifying agents, Soils, Metals, Chromium, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, *Yakima County(Washington).

PB91-921495/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 2): Mannheim Avenue Dump Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 118p EPA/ROD/R02-90/112
See also PB91-921400.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 2-acre Mannheim Avenue Dump site is a former municipally-owned industrial waste landfill in Galloway Township, Atlantic County, New Jersey. Surrounding land use is rural residential, and many residents and facilities in the area use ground water as their drinking water supply. Beginning in 1964, drummed industrial wastes, including TCE degreasing sludge, leaded porcelain fragments, and municipal waste, were buried onsite in 35 waste mounds. In 1982, a State survey indicated the presence of many unburied and leaking drums onsite. Sampling from 1985 to 1986, revealed ground water contamination onsite. In 1989, 35 mounds of contaminated soil were disposed of offsite. The Record of Decision (ROD) addresses ground water contamination at the site. The primary contaminants of concern affecting the ground water are VOCs including benzene and TCE.

Keywords: *Waste disposal, *Pollution control, *Water pollution, Decontamination, Hazardous materials, Ground water, Benzene, New Jersey, *Superfund, *First remedial action-Final, Record of Decision, Mannheim Avenue Dump, Galloway Township(New Jersey), Atlantic County(New Jersey), Ethylene/trichloro, Volatile organic compounds.

PB91-921496/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 2): Higgins Farm, Franklin Township, Somerset County, NJ. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
24 Sep 90, 48p EPA/ROD/R02-90/118
See also PB91-921400.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 75-acre Higgins Farm site is a cattle farm in Franklin Township, Somerset County, New Jersey. The site is primarily pasture land with poor onsite drainage. Approximately 3,200 residents living within a three-mile radius of the site rely on ground water as their drinking water source. In 1985, after receiving reports of ground water contamination near the farm, the State investigated the area and found a drum burial area. In 1986, the site owner began to remove the drums from the site, and ten drums were removed, crushed and placed in a roll-off container. Later in 1986, another 50 drums were excavated, and during the excavation the drums were punctured and their contents spilled onto the ground. In late 1986, State site inspections revealed ground water and soil contamination by VOCs, pesticides, metals, and dioxins. The Record of Decision (ROD) provides a permanent safe drinking water supply source for affected residents as part of an interim remedy. A future ROD will address remediation of final ground water and all remaining onsite contamination including soil, sediment, surface water, and ground water. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, TCE, and xylenes; other organics; and metals including lead.

Keywords: *Waste disposal, *Pollution control, *Water pollution, Decontamination, Hazardous materials, Ground water, Benzene, Xylenes, Lead, New Jersey, *Superfund, *First remedial action, Record of Decision, Higgins Farm, Franklin Township(New Jersey), Somerset County(New Jersey), Volatile organic compounds, Ethylene/trichloro.

PB91-921497/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 2): Pomona Oaks Well Contamination Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
26 Sep 90, 76p EPA/ROD/R02-90/120
See also PB91-921400.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 354-acre Pomona Oaks Well Contamination site is comprised of a 193-residence subdivision and an adjacent shopping center in Galloway Township, Atlantic County, New Jersey. The site overlies a surficial unconsolidated sand aquifer. Home construction at the site began in 1972, and private wells within the surficial aquifer were initially used as the water supply. In 1982, onsite residents complained of foul tasting well water, and subsequent investigations from 1982 to 1985 confirmed the presence of onsite ground water contamination. Possible contamination sources include two nearby gas stations, a salvage yard, a dry cleaner, and onsite residential septic tanks. In 1985, all homes were hooked to a municipal water supply by the State, eliminating public exposure to ground water contamination. Further sampling conducted from 1986 to 1990 revealed only low-level ground water contamination. The Record of Decision (ROD) provides a final remedy for the ground water. Because ground water contaminant levels no longer exceed health-based or State standards, there are no contaminants of concern at the site.

Keywords: *Water pollution, *Pollution control, Ground water, New Jersey, *Superfund, *First remedial action-Final, Record of Decision, Pomona Oaks Well Contamination site, Galloway Township(New Jersey), Atlantic County(New Jersey).

PB91-921498/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 2): Imperial Oil/Champion Chemicals, Marlboro Township, Monmouth County, NJ. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
26 Sep 90, 61p EPA/ROD/R02-90/128
See also PB91-921400.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 15-acre Imperial Oil/Champion Chemicals site is an active oil blending facility in Marlboro Township, Monmouth County, New Jersey. Surrounding land use is primarily residential, and several contaminated wetland areas are located to the north of the site. Since 1912, a variety of operations have taken place onsite, including food processing, chemical manufacturing, and flavor and essence production. Residual sludge and oily filter clay were disposed of onsite and wash water was discharged to an onsite settling lagoon. In 1969, Imperial Oil began onsite oil blending operations that included mixing and repacking unused oil. The resulting oil/water separator sludge reportedly has been disposed of onsite near the oily filter clay pile. Several private and State investigations from 1981 to 1990 revealed contamination in onsite soil and ground water, as well as contamination by oily sludge in two of the offsite wetland areas. Probable sources of the contamination include leaching and erosion of material from an onsite waste pile, overflowing of oil/water separators, and improper treatment of separator effluent for arsenic. The Record of Decision (ROD) addresses remediation of the contaminated offsite wetland areas. Remediation of onsite sources and contaminated ground water will be addressed in a subsequent ROD. The primary contaminants of concern affecting the soil are VOCs including benzene, toluene, and xylenes; other organics including PAHs and PCBs; and metals including arsenic, chromium, and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Benzene, Toluene, Xylenes, Aromatic polycyclic hydrocarbons, Arsenic, Chromium, Lead, Soils, New Jersey, *Superfund, *First remedial action, Record of Decision, Imperial Oil/Champion Chemicals, Marlboro Township(New Jersey), Monmouth(New Jersey), Polychlorinated biphenyls, Volatile organic compounds.

PB91-921499/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 2): Vestal Water Supply Well No. 1-1, Broome County, Vestal, NY. (Second Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 110p EPA/ROD/R02-90/130
See also PB91-921400 and PB87-190047.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Vestal Water Supply 1-1 site is located in Vestal, Broom County, New York. The site is on the south bank of the Susquehanna River, and lies east of Choconut Creek. The site lies within the floodplain of the Susquehanna River, and contains several wetland areas. A 1986 Record of Decision (ROD) documented the selection of ground water treatment using air stripping to remove volatile organic chemicals (VOCs), addressed Well 1-1 contamination, and required additional studies of four potential source areas in the State Road Industrial Park. The ROD addresses contaminated soil in the four source areas and is a final remedy. The ROD also addresses a contingency remedy for potable water, if needed. The primary contaminants of concern affecting the soil are VOCs including TCE and PCE; other organics including PAHs; and metals including chromium and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Chromium, Lead, Aromatic polycyclic hydrocarbons, New York, *Superfund, *Second remedial action-Final, Record of Decision, Vestal Water Supply 1-1, Vestal(New York), Broom County(New York), Volatile organic compounds.

PB91-921501/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 4): Schuylkill Metal, Hillsborough County, Plant City, FL. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 113p EPA/ROD/R04-90/061
See also PB91-921400.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 17-acre Schuylkill Metal site is a former battery recycling facility containing marsh areas in the southwest portion of Plant City, Hillsborough County, Florida. From 1972 to 1986, the facility was used to recycle lead from batteries; the lead was subsequently sent offsite for smelter processing. Site investigations conducted in 1981 revealed that onsite surficial aquifer monitoring wells contained elevated levels of ammonia. Analyses of soil, surface water, and sediment samples near the processing area and around the holding pond revealed elevated concentrations of metals. The Record of Decision (ROD) provides a final remedy and addresses all contaminants at the site. The contaminants of concern affecting the soil, debris, sediment, ground water, and surface water are acids and metals including lead, arsenic, and chromium.

Keywords: *Pollution control, *Waste disposal, *Water pollution, Decontamination, Hazardous materials, Soils, Ground water, Surface waters, Water pollution, Lead, Chromium, Arsenic, Florida, Debris, *Superfund, *First remedial action-Final, Record of Decision, Schuylkill Metal, Plant City(Florida), Hillsborough County(Florida), Acids.

PB91-921502/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 3): Cryo-Chem Site, Earl Township, Berks County, PA. (Second Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 111p EPA/ROD/R03-90/097
See also PB91-921400, PB90-162678, and PB90-197658.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 19-acre Cryo-chem site is a metal fabricating facility in Worman, Earl Township, Berks County, Pennsylvania. A woodland area is located northeast of the site, and an onsite stream has been identified west of the contaminant area. Between 1970 and 1982, chemical solvents were used at the facility at a rate of two to three 55-gallon drums per year. During this time, a chemical spill occurred at Cryo-chem, but cannot be definitely linked to the source of contamination. Well sampling conducted during 1985 and 1987 showed ground water contamination in monitoring and residential wells within 1 mile of the site, which led to a removal action that required the installation of activated-carbon filter units in 14 affected homes. The ROD addresses Operable Unit Two, the treatment of the ground water and containment of the contaminant plume. The primary contaminants of concern affecting the ground water are VOCs including PCE, TCE, DCA, DCE, and TCA.

Keywords: *Waste disposal, *Pollution control, *Water pollution, Decontamination, Hazardous materials, Ground water, Pennsylvania, *Superfund, *Second remedial action, Record of Decision, Cryo-Chem site, Worman(Pennsylvania), Earl Township(Pennsylvania), Volatile organic compounds.

PB91-921503/REB PC **A08**/MF **A02**
Superfund Record of Decision (EPA Region 2): King of Prussia Technical Corporation Site, Winslow Township, Camden County, NJ. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 156p EPA/ROD/R02-90/113
See also PB91-921400.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 10-acre King of Prussia (KOP) site is an abandoned waste disposal and recycling facility in Winslow Township, Camden County, New Jersey. Past waste handling and disposal practices at the facility, as well as suspected illegal dumping of trash and hazardous materials after the facility closed, have resulted in organic and inorganic contamination of site soil, sediment, and ground water. Soil and ground water contamination were detected by the State in 1976, and subsequently confirmed by EPA during site investigations conducted from 1978 to 1982. As a result of these investigations, buried plastic containers and visibly contaminated soil west of the lagoons were excavated and removed in late 1989 or 1990. However, several additional discrete areas of contamination have been identified including: metal-contaminated soil adjacent to the lagoons, lagoon sludges, swale sediment, and soil near the tankers; VOC-contaminated soil in the drum disposal area; organic- and metal-contaminated ground water; and possible contamination of the surface water and sediment in the river. The Record of Decision (ROD) addresses the first operable unit for the site, including the contaminated ground water, soil, sediment, sludges, drums and tankers. The primary contaminants of concern affecting the soil, sediment, sludge, debris, and ground water are VOCs including benzene, PCE, and TCE; and metals including chromium and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Ground water, Sediments, Debris, Sludge, Benzene, Chromium, Lead, New Jersey, *Superfund, *First remedial action, Record of Decision, King of Prussia Corporation, Winslow Township(New Jersey), Camden County(New Jersey), Volatile organic compounds, Ethylene/trichloro.

PB91-921504/REB PC **A08**/MF **A02**
Superfund Record of Decision (EPA Region 3): Raymark Site, Hatboro Borough, Montgomery County, PA. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 168p EPA/ROD/R03-90/100
See also PB91-921400.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 7-acre Raymark site is an active metal manufacturing and electroplating plant in the Borough of Hatboro, Montgomery County, Pennsylvania. The site is in an industrial area. As part of the rivet manufacturing process at the plant, VOCs, including 30 to 40 gallons of TCE, were used daily at the site to clean and degrease metal parts. The EPA discovered TCE in the Hatboro public water supply wells. Further EPA site investigations from 1980 to 1987 identified TCE in soil and other wells onsite and adjacent to the property and seem to indicate that contaminants from the site may have been at least a contributing source of contamination in the downgradient public water supply wells. Other chemical contaminants identified in samples from the public water supply wells, including TCA, did not seem to originate at the site, thus indicating several distinct sources for the contamination. The Record of Decision (ROD) addresses contaminated drinking water and ground water, which are referred to as Operable Units 2 and 3 (OU2 and OU3), respectively. The soil/source contamination (OU1), will be addressed in a subsequent ROD. The primary contaminants of concern affecting the ground water are VOCs including TCE and PCE.

Keywords: *Pollution control, Decontamination, Hazardous materials, Water pollution, Water wells, Soils, Ground water, Ethylene/trichloro, Pennsylvania, *Superfund, *First remedial action, Record of Decision, Hatboro Borough(Pennsylvania), Montgomery County(Pennsylvania), Raymark site, Volatile organic compounds.

PB91-921505/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 3): Dover Air Force Base, DE. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 64p EPA/ROD/R03-90/104
See also PB91-921400.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 3,734-acre Dover Air Force Base site is an active military base in Dover, Kent County, Delaware. Hazardous waste has been generated at the base from industrial operations, fuels management, fire training, and pesticide use. These wastes have been handled in various manners since 1941, including disposal in onsite landfills and pits, use in fire training exercises, and discharge to surface drainage ditches. The Record of Decision (ROD) addresses remediation of soil and structures within the FT-3 area. Subsequent RODs will address other sources of contamination and contaminated ground water in other site areas. The primary contaminants of concern affecting the soil, sludge, and debris are VOCs including benzene, toluene, and xylenes; metals including lead; and oils.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Debris, Benzene, Toluene, Xylenes, Lead, Oils, Delaware, *Superfund, *First remedial action, Record of Decision, Dover(Delaware), Kent County(Delaware), Dover Air Force Base, Volatile organic chemicals.

PB91-921506/REB PC **A11**/MF **A03**
Superfund Record of Decision (EPA Region 4): Hipps Road Landfill Site, Duval County, Jacksonville, FL. (First Remedial Action), (Amendment), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
21 Sep 90, 235p EPA/ROD/R04-90/060
See also PB91-921400 and PB87-189742.Portions of this document are not fully legible.

Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 7-acre Hipps Road Landfill site is an inactive landfill in Jacksonville, Duvall County, Florida. Surrounding land use is rural residential. The site overlies a sedimentary surficial aquifer system, used as a source of drinking water, which has been affected by the site. Types of hazardous waste disposed of onsite included cans of TCE and artillery rounds from U.S. Navy facilities. After onsite operations ceased, the property was divided into lots, and five homes were constructed on the landfill. Subsequently, biota in an adjacent pond died, and area residents began to complain of deteriorating well water quality. In 1983, State investigations confirmed the presence of ground water contamination. In 1989, remedial actions stemming from a 1986 Record of Decision (ROD) commenced. Ground water investigations after 1986 revealed that the ground water contamination plume was not as extensive, and the overall site quality was better than previously estimated. The ROD amends the 1986 ROD for the ground water component. The primary contaminants of concern affecting the ground water are VOCs including benzene; and metals including chromium and lead.

Keywords: *Waste disposal, *Pollution control, Hazardous materials, Decontamination, Aquifers, Ground water, Water pollution, Benzene, Chromium, Lead, Florida, *Superfund, *First remedial action-Amendment-Final, Record of Decision, Hipps Road Landfill, Jacksonville(Florida), Duvall County(Florida), Volatile organic chemicals.

PB91-921507/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 4): 62nd Street Dump, Hillsborough County, Tampa, FL. (First Remedial Action), June 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Jun 90, 87p EPA/ROD/R04-90/070
See also PB91-921400.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 5-acre 62nd Street Dump site is an inactive industrial waste disposal area in Tampa, Hillsborough County, Florida. Several marsh areas and a series of fish breeding ponds lie adjacent to the site. The site overlies a series of sedimentary rock aquifers, which are currently used as drinking water sources. In the mid-1970s, the site was used as a sand borrow pit. After the operation halted, industrial wastes, including auto parts, batteries, and kiln dust were dumped onsite. Industrial dumping ceased in 1976, but unauthorized onsite dumping of construction materials and household garbage continued. The contamination was determined to be the result of waste material leaching from the landfill. The Record of Decision (ROD) addresses source remediation and onsite and offsite ground water contamination. The primary contaminants of concern affecting the soil, debris, and ground water are organics including PCBs; and metals including arsenic, chromium, and lead.

Keywords: *Industrial waste, *Pollution control, *Waste disposal, Decontamination, Hazardous materials, Aquifers, Ponds, Ground water, Water pollution, Soils, Arsenic, Chromium, Lead, Florida, *Superfund, *First remedial action-Final, Record of Decision, 62nd Street dump site, Tampa(Florida), Hillsborough County(Florida), Kiln dust, Polychlorinated biphenyls.

PB91-921508/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 4): Zellwood Groundwater Contamination Site, (Operable Unit 1), Orange County, Zellwood, FL. (First Remedial Action), (Amendment), March 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1 Mar 90, 69p EPA/ROD/R04-90/076
See also PB91-921400 and PB89-117410.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 57-acre Zellwood Groundwater Contamination site is approximately 1/2-mile west of the town of Zellwood in Orange County, Florida. The site is situated in a rural area, and approximately 300 homes located within one mile of the site depend on private wells for their potable water supply. In 1982, EPA identified an abandoned drum storage area by a 6-acre field at the northern part of the site, which was apparently used for the disposal of drums and other wastes. Site investigations by EPA from 1988 to 1990 identified contamination in the soil, sediment, and ground water at the site. The Record of Decision (ROD) addresses remediation of onsite source areas. Ground water remediation will be addressed in a subsequent ROD. The primary contaminants of concern affecting the soil and sediment are VOCs including toluene and xylenes; other organics including PAHs and pesticides; and metals including lead and chromium.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Xylenes, Toluene, Pesticides, Chromium, Lead, Aromatic polycyclic hydrocarbons, Ground water, Water pollution, Florida, *Superfund, *First remedial action-Amendment, Record of Decision, Orange County(Florida), Zellwood Groundwater Contamination site, Volatile organic compounds.

PB91-921509/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 5): Sangamo/Crab Orchard National Wildlife Refuge (USDOI), Carterville, IL. (First Remedial Action), August 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1 Aug 90, 103p EPA/ROD/R05-90/124
See also PB91-921400.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Sangamo/Crab Orchard NWR (USDOI) site, in the Crab Orchard National Wildlife Refuge, is near Carterville, Illinois. The Department of Defense (DOD), the original administrator of the refuge, leased portions of the refuge to munitions and explosives manufacturers who continue to operate onsite. In 1947, DOD transferred the administrator of the refuge to the Department of the Interior (DOI). DOI also leased portions of the refuge to manufacturers of PCB transformers and capacitors, automobile parts, fiberglass boats, plated metal parts, and jet engine starters. The ROD focuses on the PCB-contaminated soil and sediment in four sites. The primary contaminants of concern affecting soil and sediment are organics including PCBs and metals including lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Lead, Metals, Illinois, *Superfund, *First remedial action, Record of Decision, Sangamo/Crab Orchard NWR, Carterville(Illinois), Polychlorinated biphenyls.

PB91-921510/REB PC **A08**/MF **A02**
Superfund Record of Decision (EPA Region 6): Crystal Chemical Site, Houston, TX. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 161p EPA/ROD/R06-90/062
See also PB91-921400.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 24-acre Crystal Chemical site consists of a 7-acre abandoned herbicide manufacturing facility (referred to as the onsite area) and 18 acres of affected surrounding properties (referred to as the offsite area) in Houston, Harris County, Texas. From 1968 to 1981, herbicides, including arsenide compounds were manufactured at the site. During that time several structures, four evaporation ponds, and many storage tanks were utilized. Drums of raw and finished product were routinely stored in the open. Onsite soil was contaminated by herbicides spilled from drums during transfer of raw materials from rail cars. Contamination of offsite soil and sediment was a result of periodic flooding, which caused contaminated onsite materials to be relocated offsite. The primary contaminant of concern affecting the soil, sediment, and ground water is arsenic.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Soils, Arsenic, Herbicides, Texas, *Superfund, *First remedial action-Final, Record of Decision, Crystal Chemical, Houston(Texas), Harris County(Texas).

PB91-921511/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 19), CO. (Fourth Remedial Action), February 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
26 Feb 90, 108p EPA/ROD/R08-90/039
See also PB91-921400.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Rocky Mountain Arsenal (RMA) (Operable Unit 19) site comprises part of the 17,000-acre RMA site, which is a former U.S. Army chemical warfare and incendiary munitions manufacturing and assembly plant in Adams County, Colorado. Final remediation of the RMA site will take many years to complete and thirteen Other Contamination Sources Interim Response Actions (IRAs) were determined necessary prior to implementing the Final Onpost Record of Decision (ROD). Operable Unit 19 (Rail Classification Yard) is one of the areas included in the IRAs. In 1980, the pesticide 1,2-dibromo-3-chloropropane (DBCP) was detected in the alluvial ground water near the Rail Classification Yard of RMA. Site investigations by the U.S. Army indicate DBCP contamination in unsaturated soil and sediment, possibly from leaking rail cars, to be potential sources of ground water contamination. The ROD addresses interim management of migration of the contaminated ground water plume. The primary contaminant of concern affecting the ground water is DBCP.

Keywords: *Waste disposal, *Pollution control, *Water pollution, Decontamination, Hazardous materials, Ground water, Pesticides, Colorado, *Superfund, *Fourth remedial action, Record of Decision, Rocky Mountain Arsenal, Adams County(Colorado), 1 2-dibromo-3-chloropropane(DBCP).

PB91-921512/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 17), CO. (Eighth Remedial Action), February 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1990, 92p EPA/ROD/R08-90/037
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Rocky Mountain Arsenal (RMA) (Operable Unit 17) is a part of the 17,000-acre RMA site, which is a former U.S. Army chemical warfare and incendiary munitions manufacturing and assembly plant in Adams County, Colorado. From the 1950s until late 1969, the U.S. Army used the RMA facility to produce the nerve agent GB (isopropyl methyl-phosphonofluoridate). In addition, between 1947 and 1982, private industries leased major portions of the plant facilities to manufacture various insecticides and herbicides. Since 1970, facility operations have primarily involved the destruction of chemical warfare materials. Operable Unit 17 (CERCLA Wastewater Treatment System) is among those IRAs specified. The ROD addresses the interim remedy to develop and implement a program to treat contaminated wastewaters resulting from the assessment and implementation of response actions at the RMA site. The primary contaminants of concern affecting the wastewaters are VOCs including benzene, PCE, toluene, and TCE; other organics including pesticides; and metals including arsenic, chromium, and lead.

Keywords: *Pollution control, *Waste disposal, Water pollution, Waste water, Decontamination, Hazardous materials, Insecticides, Pesticides, Benzene, Toluene, Arsenic, Chromium, Lead, Colorado, *Superfund, *Eighth remedial action, Record of Decision, Rocky Mountain Arsenal, Adams County(Colorado), Volatile organic chemicals.

PB91-921513/REB PC **A09**/MF **A02**
Superfund Record of Decision (EPA Region 6): Vertac, Inc., Jacksonville, AR. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 191p EPA/ROD/R06-90/056
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Vertac site, a former herbicide and pesticide manufacturing facility in Jacksonville, Arkansas, is comprised of an onsite and offsite area. Production of herbicides and pesticides, including 'Agent Orange,' began in 1948 and resulted in extensive onsite contamination. The offsite contamination, which is the focus of the Record of Decision (ROD), resulted from improper discharge of wastewater generated during onsite operations. Prior to 1960, untreated wastewater was discharged directly into Rocky Branch Creek, which flows into Bayou Metro a few miles south of the site. Beginning in the 1960s, wastewater was discharged to the city's Old Sewage Treatment Plant, which had been upgraded with a pretreatment facility that included an aerated lagoon and oxidation ponds (West Wastewater Treatment Plant). A solvent treatment process was later added to remove dioxin from the product. The process, however, created contaminated liquid and solid waste residues that were drummed and buried or stored onsite until 1987, when pesticide production ceased. The primary contaminant of concern affecting the soil, sediment, and sludge is 2,3,7,8-tetra-chlordibenzo-p-dioxin.

Keywords: *Waste disposal, *Pollution control, Waste water, Decontamination, Hazardous materials, Water pollution, Soils, Dioxin, Arkansas, *Superfund, *First remedial action, Record of Decision, Vertac site, Jacksonville(Arkansas), 2 3 7 8-tetra-chlorodibenzo-p-dioxin(TCDD).

PB91-921514/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 7): White Farm Equipment Company Dump Site, Floyd County, Charles City, IA. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 52p EPA/ROD/R07-90/040
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 20-acre White Farm Equipment Dump site is an active landfill near the north border of Charles City in Floyd County, Iowa. Drainage from the site toward the northwest and south feeds into adjacent wetland areas. The Charles City municipal wells, located 700 feet east of the site, obtain water from the deep, confined Cedar Valley aquifer. Additionally, six shallow drinking water wells that draw from an uncontrolled water table are 1,000 feet downgradient from the site. Intermittently since 1971, approximately 650,000 cubic yards of wet scrubber sludges, foundry sands, baghouse dusts, and other industrial wastes were disposed of onsite. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including benzene and toluene; and metals including arsenic, lead, and chromium.

Keywords: *Industrial wastes, *Pollution control, Waste disposal, Ground water, Water pollution, Soils, Benzene, Toluene, Arsenic, Chromium, Lead, Aquifers, Iowa, *Superfund, *First remedial action-Final, Record of Decision, White Farm Equipment Dump, Charles City(Iowa), Floyd County(Iowa), Volatile organic compounds.

PB91-921515/REB PC **A09**/MF **A03**
Superfund Record of Decision (EPA Region 5): NL Industries/Taracorp Lead Smelting, Granite City, IL. (First Remedial Action), March 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Mar 90, 199p EPA/ROD/R05-90/121
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The NL Industries/Taracorp Lead Smelting site is an inactive secondary lead smelting facility in a heavily industrialized section of Granite City, Madison County, Illinois. Prior to 1903, the site was used for metal refining, fabricating, and other associated activities. From 1903 to 1983, the site was used for secondary lead smelting activities. These operations generated an onsite pile of blast furnace slag and battery casing debris waste. From 1981 to 1983, St. Louis Lead Recyclers, Inc. (SLLR) used equipment on an adjacent property to recycle lead-bearing materials from the Taracorp waste pile for use in the furnaces at Taracorp. Hard rubber was the end waste product of the recycling process. The Record of Decision (ROD) addresses the Taracorp pile, the SLLR piles, and residential soil, alleys, and driveways that are contaminated by airborne lead and/or hard rubber battery casing material. The primary contaminant of concern affecting the soil and debris is lead.

Keywords: *Pollution control, *Industrial waste, Decontamination, Hazardous materials, Waste disposal, Soils, Slags, Lead, Illinois, *Superfund, *First remedial action, Record of Decision, NL Industries/Taracorp Lead Smelting, Granite City(Illinois), Madison County(Illinois).

PB91-921516/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 3): Tyson Dump Number 1, Upper Merion Township, Montgomery County, PA. (Third Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 71p EPA/ROD/R03-90/102
See also PB89-233894.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 4-acre Tyson Dump No. 1 site is an abandoned septic and chemical waste disposal area in Upper Merion Township, Montgomery County, Pennsylvania. The site consists of a series of abandoned unlined lagoons in a former sandstone quarry, and is bordered by unnamed tributaries to the Schuylkill River on the east and west, and a railroad switching yard to the north. Beyond the railroad yard is a floodplain/wetlands area and the Schuylkill River, which flows southeast toward Philadelphia. The river is the main source of drinking water in the area. From 1960 until 1973, the privately owned site was used for the disposal of liquid septic tank wastes, sludges, and chemical wastes that were hauled onsite in bulk tank trucks. The third ROD addresses OU3, the further remediation of the contaminated ground water that has migrated under the Schuylkill River. Additional ground water investigations will be conducted on the north side of the river, and based on the results, a fourth operable unit may be identified. The primary contaminants of concern affecting the ground water are VOCs including toluene and xylenes.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Toluene, Xylene, Pennsylvania, *Superfund, *Third remedial action, Record of Decision, Tyson Dump 1 site, Upper Merion Township(Pennsylvania), Montgomery County(Pennsylvania), Volatile organic compounds.

PB91-921517/REB PC **A05**/MF **A02**
Superfund Record of Decision (EPA Region 5): Oconomowoc Electroplating Company Site, Ashippun, WI. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
20 Sep 90, 99p EPA/ROD/R05-90/129
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 10.5-acre Oconomowoc Electroplating site encompasses a 5-acre active electroplating facility and 5 acres of adjacent wetlands in Dodge County, Ashippun, Wisconsin. Electroplating, finishing, and degreasing processes performed since 1957 at the OEC facility produce a multi-source effluent stream contaminated with heavy metals and VOCs. The effluent, as well as accidental spills and leaks around the property, have resulted in widespread site contamination. Prior to 1972, untreated wastewaters were discharged directly into the Davy Creek wetlands, and even after the construction of two treatment lagoons, untreated wastes and sludge overflowed the lagoons and continued to accumulate in the wetlands. Lagoon sludge removal was initiated by OEC in 1979 but was never completed, and therefore, discharge of contaminants, including RCRA-listed hazardous waste (F006), continued into the wetlands. Due to its complexity, the site has been divided into four Operable Units (OU) for remediation: the surface water, sludge and contaminated soil associated with the two lagoons (OU1); all other contaminated soil around the OEC facility not associated with the lagoons or found beneath the manufacturing building, including a fill area, a lowlands area, the drainage ditches and the parking lot area (OU2); the associated contaminated ground water (OU3); and the highly contaminated sediment in the Davy Creek wetlands area (OU4). The primary contaminants of concern affecting the soil, sediment, debris, sludge, ground water and surface water are VOCs including TCE, toluene, and xylenes; and metals including chromium and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous wastes, Water pollution, Ground water, Surface water, Soils, Debris, Sludge, Toluene, Xylenes, Metals, Chromium, Lead, Wisconsin, *Superfund, *Remedial action, Record of Decision, Oconomowoc Electroplating Company, Ashippun(Wisconsin), Dodge County(Wisconsin), Volatile organic compounds.

PB91-921518/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 5): Algoma Municipal Landfill, Algoma, WI. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Sep 90, 70p EPA/ROD/R05-90/145
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 13-acre Algoma Municipal Landfill site is an inactive municipal landfill in Algoma, Kewaunee County, Wisconsin. The site overlies an aquifer that currently supplies water to private wells. Solvents, thinners, lacquers, as well as municipal wastes were reportedly disposed of in the main landfill area known as the Landfill Disposal Area (LDA). Approximately 400,000 cubic yards of municipal wastes were disposed of at the site. In 1983, the landfill was closed and the wastes were covered. However, over time, the cap has deteriorated due to weather and lack of protection from freezing and thawing. Therefore, the current cover has not been impermeable and landfill contaminants have been released into the ground water. EPA site investigations conducted in 1984 and 1989 revealed onsite ground water contamination caused by sources leaching from the LDA. The Record of Decision (ROD) addresses the remediation of contaminated source and ground water. The primary contaminants of concern affecting the ground water, soil, and debris are VOCs including benzene; other organics; and metals including arsenic and cadmium.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Ground water, Debris, Soils, Benzene, Metals, Arsenic, Cadmium, Wisconsin, *Superfund, *Remedial action, Record of Decision, Algoma Municipal Landfill, Algoma(Wisconsin), Kewaunee County(Wisconsin), Volatile organic compounds.

PB91-921519/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 5): Reilly Tar and Chemical Corporation Site, St. Peter Aquifer, St. Louis Park, MN. (Third Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 61p EPA/ROD/R05-90/147
See also PB87-189387.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 80-acre Reilly Tar and Chemical (St. Louis Park) site is a former coal tar distillation and wood preserving plant in St. Louis Park, Minnesota. The site overlies a complex system of aquifers, including the St. Peter aquifer that provide drinking water to area residences. The St. Peter Aquifer contains one municipal well, which is used during periods of peak demand, however, the majority of the drinking water in St. Louis Park is obtained from deeper aquifers. From 1917 to 1972, wastewater containing creosote and coal tar was discharged to onsite surface water, and as a result, small wastewater spills occurred into onsite soil. The ROD addresses Operable Unit 4 (OU4), remediation of the St. Peter aquifer. A subsequent ROD will address any remaining site problems as OU3. The primary contaminants of concern affecting the ground water are organics including PAHs and phenols.

Keywords: *Waste disposal, *Pollution control, *Aquifers, Decontamination, Hazardous materials, Ground water, Water pollution, Aromatic polycyclic hydrocarbons, Phenols, Minnesota, *Superfund, *Remedial action, Record of Decision, Reilly Tar and Chemical, Saint Louis Park(Minnesota), St. Peter Aquifer.

PB91-921520/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 6): Pagano Salvage Site, Los Lunas, NM. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 23p EPA/ROD/R06-90/058
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 1.4-acre Pagano Salvage site is in Los Lunas, Valencia County, New Mexico, and consists of a family-run salvage business and a residence. During 1983, salvage operations at the site included purchasing 'high technology' scrap material from Federal facilities such as transformers, drums containing waste fluids, and capacitors. Site inspections in 1984, 1985, and 1986 revealed several areas of soil contamination in the yard due to leaks from scrap materials, which released PCB-contaminated oil into the soil. These areas included two surface burn areas, a stained soil area, and a surface pool of oil. In 1990, EPA removed approximately 5,100 cubic yards (i.e., soil in excess of 10 mg/kg PCBs based on TSCA cleanup policy) of contaminated soil and debris for disposal in an approved RCRA facility offsite. Soil containing less than 10 mg/kg PCB was covered with a 10-12 inch soil cover. Soil sampling has confirmed that this removal has resolved the PCB contamination at the site and EPA proposes no additional remedial action. Based on this rationale, there are no primary contaminants of concern affecting the site. The selected remedial action for the site is a no action remedy with ground water monitoring for one year at the request of the State.

Keywords: *Waste disposal, *Pollution control, Soil sampling, Hazardous materials, Polychlorinated biphenyls, *Superfund, Pagano Salvage, Los Lunas(New Mexico), Valencia County(New Mexico), *Final remedial action.

PB91-921521/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 6): Arkwood, Inc., Omaha, AR. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 122p EPA/ROD/R06-90/064
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 15-acre Arkwood site is a former wood treatment facility in Boone County, Arkansas. Land use in the vicinity of the site is primarily agricultural and light industrial. Ground water on, or near the site is highly susceptible to contamination as a result of underground cavities, enlarged fractures and conduits which hinder monitoring and pumping. State investigations conducted during the 1980s documented PCP and creosote contamination in surface water, soil, debris, and buildings throughout the site. Contaminated surface features at the site include the wood treatment facility, a sinkhole area contaminated with oily waste, a ditch area, a wood storage area, and an ash pile. In 1987, EPA ordered the site owner to perform an immediate removal action, which included implementing site access including fencing and sign postings. The Record of Decision (ROD) addresses remediation of all affected media, and provides the final remedy for the site. The primary contaminants of concern affecting the soil, sludge, debris, ground water and surface water are organics including pentachlorophenol (PCP), PAHs, and dioxin; and oils.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Surface water, Soils, Sludge, Debris, Dioxin, Aromatic polycyclic hydrocarbons, Oils, Arkansas, *Superfund, *Remedial action, Arkwood Incorporated, Boone County(Arkansas), Omaha(Arkansas), Pentachlorophenol(PCP), Record of Decision.

PB91-921523/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 9): Coalinga Asbestos Mine, Fresno County, CA. (Second Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
21 Sep 90, 56p EPA/ROD/R09-90/049
See also PB90-138314.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 557-acre Coalinga Asbestos Mine site, a former asbestos processing area and chromite mine, comprises part of the Johns Manville Coalinga Asbestos Mill site in western Fresno County, California. This rural mountainous area is used primarily for recreational purposes. From 1962 to 1974, asbestos ore from several local mines was processed and sorted onsite, and the resulting asbestos mill tailings were periodically bulldozed into an intermittent stream channel. Subsequently, from 1975 to 1977, a chromite milling operation was conducted onsite. Tailings were often washed downstream during periods of stream flow, and the resuspension of asbestos fibers from the tailings into the air produced a significant inhalation hazard. As a result of these activities, approximately 450,000 cubic yards of mill tailings and asbestos ore remain onsite within a large tailing pile. In 1980 and 1987, State investigations indicated that the site was contributing a significant amount of asbestos into the surface water. The site will be remediated as two Operable Units (OU). The Record of Decision (ROD) addresses the remedial action for OU2, the Johns Manville Coalinga Asbestos Mill Area. The primary contaminant of concern affecting the surface water is asbestos.

Keywords: *Pollution control, Decontamination, Hazardous materials, Surface water, Asbestos, California, *Superfund, *Remedial action, Johns Manville Coalinga Asbestos Mill, Fresno County(California), Mill tailings, Record of Decision.

PB91-921524/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 5): Master Disposal Service Landfill, Brookfield, WI. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
26 Sep 90, 64p EPA/ROD/R05-90/146
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 26-acre Master Disposal Service Landfill site is an inactive industrial landfill in the Town of Brookfield, Waukesha County, Wisconsin. The site overlies a surficial sand/gravel and dolomite aquifer system, which has been contaminated by onsite disposal activities. Onsite disposal of mainly industrial foundry sands and slags occurred between 1967 and 1982. Onsite disposal of hazardous wastes including inks, sludges, and solvents was also observed during this period. Investigations completed in 1990 identified negative impacts on surface water and ground water from the landfill sources. The Record of Decision (ROD) addresses source control as a final remedy and management of migration of ground water as an interim remedy. A subsequent ROD will address the final restoration of the surficial aquifer system. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including benzene, TCE, toluene, and xylenes; and metals including arsenic, chromium, and lead.

Keywords: *Waste disposal, *Pollution control, Aquifers, Decontamination, Hazardous materials, Ground water, Water pollution, Solvents, Surface waters, Benzene, Toluene, Xylenes, Metals, Arsenic, Chromium, Lead, Soils, Wisconsin, *Superfund, *First remedial action, Record of Decision, Master Disposal Service Landfill Site, Waukesha County(Wisconsin), Ethylene/trichloro, Volatile organic compounds.

PB91-921525/REB PC **A09**/MF **A02**
Superfund Record of Decision (EPA Region 4): Munisport Landfill Site, Dade County, North Miami, FL. (First Remedial Action), July 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
26 Jul 90, 186p EPA/ROD/R04-90/062
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 291-acre Munisport Landfill site, including a 170-acre, inactive municipal landfill, is within the city of North Miami, Dade County, Florida. The city of North Miami leased 291 acres to Munisport for recreational development in 1971 which began filling low-lying areas of the site with clean fill and construction debris. In 1975, a temporary permit allowed solid waste to be used as fill above the water table. However, in 1976, a State inspection found twelve 55-gallon drums that were leaking wastes onsite; a violation was issued, and these drums were removed offsite by the city. Landfilling operations ceased in 1981, but closure has not yet taken place. Leachate from the landfill waste still poses a significant threat to the aquatic organisms in the Mangrove Preserve. The ground water is no longer used for potable purposes as a result of salt water intrusion. The contaminants of concern affecting the ground water include VOCs such as benzene and toluene; other organics; metals, such as arsenic, chromium, and lead; and other inorganics.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Ground water, Water pollution, Leachates, Benzene, Toluene, Metals, Arsenic, Chromium, Lead, Florida, *Superfund, *First remedial action-Final, Record of Decision, Munisport Landfill site, North Miami(Florida), Dade County(Florida), Volatile organic compounds.

PB91-921526/REB PC **A07**/MF **A02**
Superfund Record of Decision (EPA Region 2): Claremont Polychemical, Nassau County, Old Bethpage, NY. (Second Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 135p EPA/ROD/R02-90/123
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 9.5-acre Claremont Polychemical site is an abandoned production facility in Oyster Bay, Nassau County, New York. The principal wastes generated were organic solvents, resins, and mineral spirits wash wastes. In 1979, the State identified improper storage practices onsite, including stockpiles of over 2,000 uncovered or leaking drums of wastes and an onsite spill area. Organic solvents from several onsite spills and discharge incidents may have contaminated onsite soil and ground water. By 1980, most of the onsite drums were sorted and removed offsite, reused, or burned onsite. Subsequently, contaminated soil was excavated and placed on a plastic sterile liner, which has degraded over time. Ground water investigations in 1980 revealed ground water contamination directly under the site. The remedial actions for the site have been divided into two Operable Units (OUs). The Record of Decision (ROD) focuses on OU2, overall remediation of ground water and soil/wastes contained onsite in drums and holding basins. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including PCE, TCE, toluene, and xylenes;

other organics; metals including arsenic, chromium, and lead; and inorganics including asbestos.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Soils, Toluene, Xylenes, Metals, Arsenic, Chromium, Lead, Asbestos, New York, *Superfund, *Second remedial action-Final, Record of Decision, Claremont Polychemical, Oyster Bay(New York), Nassau County(New York), Ethylene/trichloro, Volatile organic compounds.

PB91-921527/REB PC **A05/MF A01**
Superfund Record of Decision (EPA Region 2): Metaltec/Aerosystems, Franklin Borough, Sussex County, NJ. (Second Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 76p EPA/ROD/R02-90/116
See also PB87-189957.Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 15.3-acre Metaltec/Aerosystems site is a former metal products manufacturing operation in the Borough of Franklin, Sussex County, New Jersey. A marshy wetlands area is southeast of the site, and surrounding land use is primarily semi-rural residential. The Metaltec plant was operated from 1965 to 1980 and the area surrounding the plant included a process well, a wastewater lagoon, a drum storage area, soil saturated with wastewater, and two piles of waste material. In 1980, the State detected VOCs in the wastewater lagoon, surrounding soil, and in onsite ground water. In 1981, the State ordered Metaltec/Aerosystems to remove waste material from the wastewater lagoon, and in 1982 the lagoon was partially excavated and filled. The ROD addresses final ground water remediation at the site. The primary contaminants of concern affecting the ground water are VOCs including PCE, TCE, toluene, and xylenes; and metals including chromium and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Toluene, Xylenes, Metals, Chromium, Lead, New Jersey, *Superfund, *Second remedial action-Final, Record of Decision, Metaltec/Aerosystems, Sussex County(New Jersey), Volatile organic compounds.

PB91-921528/REB PC **A20/MF A04**
Superfund Record of Decision (EPA Region 8): Silver Bow Creek/Butte Area NPL Site, Warm Springs Ponds Operable Unit, Upper Clark Fork River Basin, MT. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 454p EPA/ROD/R08-90/030
Portions of this document are not fully legible.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Silver Bow Creek site is a mining and processing area in the Upper Clark Fork River Basin, Deer Lodge County, Southwestern Montana. The Record of Decision (ROD) documents the selected interim remedial action for one of eleven operable units for the site, the Warm Springs Ponds operable unit, which covers approximately 2,500 acres just above the beginning of the Clark Fork River. Contamination at the site is the result of over 100 years of mining and process operations in the area. Mining, milling, and smelting waste were dumped directly into Silver Bow Creek and transported downstream to the Clark Fork River with final deposition downstream as far as 130 miles. Principal threats from the site include the possibility of pond berm failure due to flood and earthquake damage that could release millions of cubic yards of tailings and sediment to the river. Furthermore, the creeks are contaminated with dissolved metals, and exposed soil and tailings are contaminated with elevated levels of several metals. The primary contaminants of concern affecting the soil, sediment, ground water, and surface water are metals including arsenic, cadmium, copper, lead, and zinc.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Ground water, Surface water, Water pollution, Soils, Metals, Arsenic, Lead, Copper, Zinc, Cadmium, Montana, *Superfund, *First remedial action, Record of Decision, Silver Bow Creek site, Upper Clark Fork River Basin(Montana), Deer Lodge County(Montana).

PB91-921529/REB PC **A05/MF A01**
Superfund Record of Decision (EPA Region 2): Chemical Leaman Tank Lines Site, Logan Township, Gloucester County, NJ. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 91p EPA/ROD/R02-90/114
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The 31-acre Chemical Leaman Tank Lines site is a liquid tanker truck terminal and cleaning operation in Logan Township, Gloucester County, New Jersey. Surrounding land use is primarily rural residential. An extensive wetlands area occupies the southern and eastern portions of the site. An underlying aquifer was used as a local drinking water supply until the late 1970s when ground water contaminants including solvents, were detected in the aquifer. From 1961 to 1975, wastewater from tanker washing and rinsing operations was discharged into a network of seven unlined settling/aeration lagoons, which have been determined to be the source of the present organic and inorganic contamination of soil, ground water, and adjacent wetlands. The Record of Decision (ROD) addresses remediation of the ground water contaminant plume. Subsequent RODs will address source control, surface water, and sediment contamination. The primary contaminants of concern affecting ground water are VOCs including benzene, PCE, and TCE; other organics; and metals including arsenic, chromium, and lead.

Keywords: *Waste disposal, *Pollution control, Hazardous materials, Decontamination, Water pollution, Ground water, Benzene, Metals, Arsenic, Chromium, Lead, Organics, New Jersey, *Superfund, *First remedial action, Record of Decision, Chemical Leaman Tank Lines, Logan Township(New Jersey), Gloucester County(New Jersey), Ethylene/trichloro, Volatile organic compounds.

PB91-921530/REB PC **A05/MF A01**
Superfund Record of Decision (EPA Region 4): City Industries, Winter Park, FL. (First Remedial Action), March 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Mar 90, 77p EPA/ROD/R04-90/059
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The City Industries site is a former hazardous waste recycling and transfer facility in Goldenrod Township, Orange County, Florida, near the cities of Winter Park and Orlando. The city of Winter Park's water supply well field is located approximately 1,900 feet west of the site. These wells draw from the deep Floridan aquifer, which is separated from a surficial aquifer by a 140-foot-thick confining layer. In 1971, a former fuel oil business at the site was developed into a waste-handling facility. Activities at the site included receiving, handling, storing, reclaiming, and disposing of various waste chemicals. Improper disposal practices and intentional dumping led to onsite soil and surficial ground water contamination. The Record of Decision (ROD) addresses contaminated ground water, which is migrating through the surficial aquifer, a potential drinking water source, and prevention of contaminant migration to the deeper Floridan aquifer. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, TCE, and toluene.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Aquifers, Benzene, Toluene, Florida, *Superfund, *First remedial action-Final, Record of Decision, Goldenrod Township(Florida), Orange County(Florida), Ethylene/trichloro.

PB91-921531/REB PC **A04/MF A01**
Superfund Record of Decision (EPA Region 4): Bypass 601 Groundwater Contamination Site (Martin Scrap Recycling Facility), Concord, NC. (First Remedial Action), August 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
31 Aug 90, 60p EPA/ROD/R04-90/078
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Bypass 601 Groundwater Contamination site, is in Concord, Cabarrus County, North Carolina. One of the potential sources of onsite contamination is the 13-acre Martin Scrap Recycling Facility (MSR) facility, an inactive battery salvage and recycling operation. The MRS Facility consists of two tracts of land; the larger tract includes a main facility that was used for lead reclamation activities; and the second lot encompasses the floodplain area. The Main Facility is comprised of several lead-contaminated buildings including a scale house, several garages and sheds, as a result of onsite battery cracking operations. Contaminated debris including old tanks, drums, wires, casings, and trash is spread throughout the Main Facility area. The southeastern corner of the Main Facility has been backfilled with cracked battery casings to a depth of 20 feet. Approximately 57,000 cubic yards of lead-contaminated soil remains onsite from previous battery salvage activities. The Record of Decision (ROD) addresses Operable Unit 1 (OU1), which will contain the source contamination from the MSR facility to minimize the continued degradation of ground water and surface water. Subsequent RODs will address the final action and remediation of other onsite contaminant sources (OU2) and ground water contamination (OU3). The primary contaminants of concern affecting the soil and debris are metals including chromium and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Debris, Metals, Chromium, Lead, North Carolina, *Superfund, *First remedial action, Record of Decision, Concord(North Carolina), Cabarrus County(North Carolina), Bypass 601 Groundwater Contamination site.

PB91-921532/REB PC **A05/MF A01**
Superfund Record of Decision (EPA Region 7): Wheeling Disposal Service Company Landfill, Amazonia, MO. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 83p EPA/ROD/R07-90/044
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 200-acre Wheeling Disposal Service site is an inactive industrial and sanitary landfill in Amazonia, Missouri. Onsite disposal features include nine solid waste trenches, five liquid waste trenches, two evaporation ponds, a farm chemical area, three tannery waste areas, and a rinsed-container area. From 1964 until the landfill was closed in 1986, municipal and industrial wastes, including tanning sludges, pesticides, asbestos, laboratory wastes, construction debris, paint sludges, battery and cyanide waste, and crushed drums were disposed of in the various onsite disposal units. EPA and the State conducted onsite and offsite investigations from 1980 to 1987 that identified the presence of onsite contamination with no evidence of offsite contaminant migration. The remedial investigation/feasibility study conducted in 1989 and 1990 confirmed these results. The Record of Decision (ROD) addresses both source control and management of contaminant migration, and is a final remedy. The primary contaminants of concern affecting the soil, sediment, ground water, and surface water are VOCs including TCE and toluene; other organics including pesticides; and metals including arsenic, chromium, and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Surface water, Soils, Toluene, Pesticides, Metals, Arsenic, Chromium, Lead, Missouri, *Superfund, *Remedial action, Record of Decision, Wheeling Disposal Service, Amazonia(Missouri), Volatile organic compounds, Ethylene/trichloro.

PB91-921533/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 2): Mattiace Petrochemical Company, Broome County, Glen Cove, NY. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 44p EPA/ROD/R02-90/119
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The 2-acre Mattiace Petrochemical site is an inactive liquid storage and redistribution facility in Glen Cove, Nassau County, New York. The site overlies a system of three unconsolidated sedimentary aquifers, which may be affected by onsite contamination. From the mid-1960s to 1986, organic solvents were stored, blended, and repackaged onsite. Drums were reconditioned onsite, and resulting water/solvent mixtures were discharged to above-ground tanks or to an onsite leaching pond. A solvent water separator was used to collect overflow from the above-ground tanks for discharge to the leaching pond. There is evidence, however, that overflow from these tanks may have been discharged directly into the soil. The Record of Decision (ROD) addresses Operable Unit 2 (OU2) and includes removal of drummed sludges and highly contaminated soil. The primary contaminants of concern affecting the soil, sludge, and debris are VOCs including benzene, PCE, TCE, toluene, and xylenes; other organics including phenols; and metals including arsenic, chromium, and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Sludge, Debris, Benzene, Toluene, Xylenes, Phenols, Metals, Arsenic, Chromium, Lead, New York, *Superfund, *Remedial action, Record of Decision, Mattiace Petrochemical, Glen Cove(New York), Nassau County(New York), Ethylene/trichloro, Volatile organic compounds.

PB91-921534/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 9): Intel Santa Clara III Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
20 Sep 90, 122p EPA/ROD/R09-90/055
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The Intel (Santa Clara III) site includes a plant that performs quality control testing of chemicals and electrical testing of semiconductors in Santa Clara, Santa Clara County, California. The site is in a predominantly industrial area, and overlies a major ground regional source of ground water, the Santa Clara Valley ground water basin. In 1982, the State conducted a leak detection program, which identified VOC contamination in an onsite shallow aquifer. Possible sources for the contamination may include the accidental dumping of solvents into an acid neutralization tank, accidental spills near an above-ground solvent storage facility, and cleaning of solvent-contaminated pipes during plant construction. It has been determined that no onsite source is presently contributing to ground water contamination. Since 1985, Intel has been pumping and treating ground water using granular activated carbon as an Initial Remedial Measure (IRM). The Record of Decision (ROD) addresses a final solution for restoring ground water to its beneficial use. The primary contaminants of concern affecting the ground water are VOCs including TCE.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, California, *Superfund, *Remedial action, Record of Decision, Intel Santa Clara III, Santa Clara(California), Santa Clara County(California), Volatile organic compounds.

PB91-921535/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 9): Intersil/Siemens Superfund Site, Cupertino, CA. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 103p EPA/ROD/R09-90/052
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 12-acre Intersil site contains two industrial properties, Intersil, Inc., and Siemens Components, Inc., in Cupertino, California. Since 1978, Siemens has manufactured semiconductor products for optoelectronic applications at the site. Solvents are currently stored above-ground and wastewater is treated in an acid neutralization system. From 1967 to 1988, Intersil operated as a semiconductor assembly facility. Two vaulted and one unvaulted underground acid neutralization systems, now excavated, were used in the operation. Both facilities used various organic solvents and commercial mixtures. Contamination, a result of releases from the underground waste handling facilities at both plants, has been detected in soil and ground water beneath the site. A contaminant plume also has been detected, which affects offsite ground water. The Record of Decision (ROD) outlines the final remedy addressing onsite source areas, and onsite and offsite contaminated ground water. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE, TCE, and toluene; and other organics including phenols.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Ground water, Soils, Toluene, Phenols, California, *Superfund, *Remedial action, Record of Decision, Intersil/Siemens, Cupertino(California), Volatile organic compounds.

PB91-921539/REB PC **A11**/MF **A03**
Superfund Record of Decision (EPA Region 4): Howe Valley Landfill, Howe Valley, KY. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 233p EPA/ROD/R04-90/063
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The 11-acre Howe Valley Landfill site is an inactive landfill in Howe Valley, Hardin County, Kentucky. A Class IIA aquifer underlies the site, but is not currently used as a drinking water source. Ground water flow is southeasterly toward Boutwell Spring and Linders Creek. From 1967 to 1976, 2.5 acres of the site were used for disposal of refuse and manufacturing by-products. In 1974, a State inspection revealed that acidic liquid wastes were being dumped directly into the landfill, in direct violation of the solid-waste disposal permit issued. Although the permit expired in 1974, the landfill continued dumping operations until 1976. In 1988, EPA required the removal of 9,150 full or partially filled drums containing metal plating sludge, caulk, flammable silicone polymers, and paint-like pigments; 1,621 empty drums; 6,000 smaller containers; and 3,000 cubic yards of loose waste from the site. State investigations in 1987 found that the potential migration of the waste posed a drinking water hazard. Contaminant levels for the underlying ground water system cannot accurately be monitored because of the karst topography at the site. This remedial action focuses on reducing the source contamination. The primary contaminants of concern affecting the soil are VOCs including PCE; and metals including chromium.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Metals, Chromium, Kentucky, *Superfund, *Second remedial action-Final, Record of Decision, Howe Valley Landfill site, Howe Valley(Kentucky), Hardin County(Kentucky), Volatile organic compounds.

PB91-921540/REB PC **A07**/MF **A02**
Superfund Record of Decision (EPA Region 8): Portland Cement Co. (Kiln Dust No. 2 and No. 3) Operable Unit 1, Salt Lake City, UT. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1990, 148p EPA/ROD/R08-90/029
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The 71-acre Portland Cement (Kiln Dust No. 2 and No. 3) site is in a primarily industrial/commercial area of Salt Lake City, Utah, and consists of 3 separate but adjacent properties known as Site 2, Site 3, and the West Site. Between 1965 and 1983, the Portland Cement Co. deposited approximately 495,000 cubic yards of waste cement kiln dust (CKD) on each of the three properties comprising the site. Waste CKD consists primarily of heavy metals and other inorganics and is highly alkaline. The waste CKD has also produced a contaminant plume which is present in the shallow ground water beneath the site and some adjacent properties. The Record of Decision, the first operable unit, addresses removal of the waste CKD and temporary onsite storage of the chromium bricks. The primary contaminants of concern affecting the waste CKD are metals including arsenic, chromium, and lead, and other inorganics.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Metals, Arsenic, Chromium, Lead, Utah, *Superfund, *Remedial action, Portland cement, Salt Lake City(Utah), Cement kiln dust.

PB91-921541/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 7): Shenandoah Stables, Lincoln County, MO. (Second Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 39p EPA/ROD/R07-90/042
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The Shenandoah Stables (SS) site is located in a rural area near Moscow Mills, Lincoln County, Missouri, within the upper floodplain of Crooked Creek. The property includes an enclosed arena and horse stables building, a number of single family residences, a livestock operation, and other small businesses on approximately 5- to 10-acre land parcels around the facility. In 1971, the area inside the arena was sprayed with approximately 1,500 gallons of dioxin-contaminated waste oil for dust control purposes. Subsequently, a number of adverse effects were noted in horses, other animals, and in humans. The ROD addresses the final remedy for the site, the removal of 3,471 cubic yards of contaminated materials currently stored onsite in 2,660 separate containers. The primary contaminant of concern affecting the soil and debris is dioxin.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Debris, Dioxin, *Superfund, *Remedial action, Record of Decision, Lincoln County(Missouri), Shenandoah Stables.

PB91-921542/REB PC **A04**/MF **A01**
Superfund Record of Decision (EPA Region 10): Fort Lewis Logistics Center, Pierce County, Fort Lewis, WA. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
25 Sep 90, 67p EPA/ROD/R10-90/025
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 650-acre Fort Lewis Logistics Center site is a military storage and maintenance facility in Pierce County, Washington. Surrounding land use is mixed residential and commercial. The site overlies a surficial aquifer, and a deeper bedrock aquifer that is used as a water supply to over 85,000 people in the area. The Logistics Center is an industrial complex, which includes warehouses, motor pools, maintenance facilities, and an equipment disposal yard. From the 1940s to the mid 1970s, solvents including TCE and PCE were used as degreasers during maintenance activities. The solvents were frequently combined with waste oil and disposed of at several locations within the Logistics Center. Site investigations from 1985 to 1988 detected VOC contamination in onsite monitoring wells and offsite private wells. As a result of these findings, affected residents were connected to a public water supply. The Record of Decision (ROD) addresses restoration of the contaminated surficial ground water aquifer, and provides a final remedy for the site. Confirmation soil

sampling and further characterization of the deep aquifer contamination will be evaluated as part of the remedial action. The primary contaminants of concern affecting the ground water are VOCs including DCE, PCE, and TCE.

Keywords: *Waste disposal, *Pollution control, *Aquifers, Decontamination, Hazardous materials, Water pollution, Ground water, Metals, Chromium, Lead, Washington, *Superfund, *First remedial action-Final, Record of Decision, Fort Lewis Logistics Center, Pierce County(Washington), Volatile organic compounds.

PB91-921543/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 6): Cimarron Mining Corporation Site, Operable Unit 1, Lincoln County, Carrizozo, NM. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
21 Sep 90, 81p EPA/ROD/R06-90/060
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 10.6-acre Cimarron Mining site, Lincoln County, New Mexico, is an inactive milling facility used to recover iron from ores transported to the site. A shallow aquifer, which is not a potential drinking water source, and a deeper primary drinking water aquifer lie beneath the site. Cyanide was used until 1982 to recover precious metals. The operation of the mill resulted in the discharge of contaminated liquids onsite. The sources of environmental cyanide contamination at the site are the processed waste materials, including tailings piles and cinder block trench sediment piles, the cyanide solution and tailings spillage areas, and the cyanide solution recycling and disposal areas, including cinder block trenches and an unlined discharge pit. The major sources of ground water contamination by cyanide are the cinder block trenches and the discharge pit. These areas of prolonged contact between cyanide solution and underlying soil led to cyanide contamination in the shallow aquifer. The ROD addresses contaminated shallow ground water at the Cimarron Mining mill area as Operable Unit 1 (OU1). The primary contaminants of concern affecting the ground water are inorganics including cyanide.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Cyanide, New Mexico, *Superfund, *Remedial action, Record of Decision, Cimarron Mining, Lincoln County(New Mexico).

PB91-921544/REB PC **A07**/MF **A02**
Superfund Record of Decision (EPA Region 9): Solvent Service Superfund Site, San Jose, CA. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 137p EPA/ROD/R09-90/050
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The 3-acre Solvent Service (SSI) site is an active treatment, storage and disposal facility in San Jose, California. Since 1983, SSI has been operated as a treatment, storage, and disposal facility. Mixed and segregated solvents have been recycled by a variety of methods including distillation, separation, and blending. After VOCs were detected in the ground water, the California Water Quality Control Board adopted Waste Discharge Requirements requiring further site investigations and implementation of interim remedial measures. In 1988 and then again in 1989, the Board adopted Revised Waste Disposal Requirements requiring completion of the pollution investigation, final installation of soil cleanup measures, and submittal of an RI/FS and RAP. SSI is currently operating a containment/extraction system for the ground water plume. The primary contaminants of concern affecting the soil and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Soils, Benzene, Toluene, Xylenes, California, *Superfund, *Remedial action, Record of Decision, Solvent service, San Jose(California), Volatile organic compounds, Ethylene/trichloro.

PB91-921545/REB PC **A03**/MF **A01**
Superfund Record of Decision (EPA Region 5): Hagen Farm Site, Source Control Operable Unit, Dane County, WI. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
17 Sep 90, 41p EPA/ROD/R05-90/127
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 10-acre Hagen Farm site is a former waste disposal facility in Dane County, Wisconsin. From 1950 to 1966, waste materials were disposed of in three subareas of the site's defined area of contamination. Onsite investigations indicate that subarea A, a 6-acre area in the southern portion of the site, contains industrial wastes consisting of solvents and various other organics as well as municipal waste, whereas subareas B and C, each 1.5-acre areas in the northeastern portion of the site, appear to contain only scattered municipal wastes. Site investigations have determined the need for two concurrent operable units. The source control operable unit, which is defined in the Record of Decision (ROD), addresses the waste refuse and subsurface soil at areas A, B, and C with the goal of controlling the migration of the waste refuse and sub-soil and reducing the volume of contaminants from the waste and sub-soil to the ground water. The primary contaminants of concern affecting the soil and waste refuse are VOCs including benzene, toluene, xylenes; other organics including phenols and PCBs; and metals including lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Debris, Benzene, Toluene, Xylenes, Phenols, Polychlorinated biphenyls, Metals, Lead, Wisconsin, *Superfund, *Remedial action, Record of Decision, Hagen Farm, Dane County(Wisconsin), Volatile organic compounds.

PB91-921546/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 4): Yellow Water Road Site, Duval County, Baldwin, FL. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 116p EPA/ROD/R04-90/067
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 14-acre Yellow Water Road site is a former storage area for PCB-contaminated liquids and electrical equipment in Baldwin, Duval County, Florida. In 1981, onsite storage of PCB-contaminated liquids and electrical equipment began at the former operational area in anticipation of upcoming onsite incineration operations, but the proper permits for the incinerator were never obtained. Subsequently in 1982, PCB-contaminated oils were spilled at the site as a result of onsite salvage operation which included metal removal from transformers. The Record of Decision (ROD) addresses the remediation of PCB-contaminated soil and sediment. The primary contaminants of concern affecting the soil and sediment are other organics including PCBs.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Sediments, Polychlorinated biphenyls, *Superfund, *Remedial action, Record of Decision, Yellow Water Road site, Baldwin(Florida), Duval County(Florida).

PB91-921547/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 5): Kummer Sanitary Landfill, Northern Township, Beltrami County, MN. (Third Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Sep 90, 83p EPA/ROD/R05-90/134
See also PB85-249548 and PB89-196786.Portions of this document are not fully legible.
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The 35-acre Kummer Sanitary Landfill site is an inactive mixed municipal waste landfill in Northern Township, Beltrami County, Minnesota, approximately one mile west of Lake Bemidji. A large residential area lies approximately 1,000 feet east of the site, and there is a hospital directly southwest. The privately owned landfill was operated from 1971 until 1985; however, business records for the site are virtually nonexistent. Operations at the landfill caused the State to take a number of administrative and enforcement actions. Following the discovery of ground water contamination in Northern Township in 1984, the State issued a public health advisory concerning the well water and provided a temporary water supply. Two previous Records of Decision (RODs) in 1985 and 1988 documented the provision of an alternative water supply for the Northern municipal water system as Operable Unit 1 (OU1), and a source control Operable Unit (OU2), which included a cover system to control the source of contamination (OU3). The final ROD addresses ground water contamination. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, TCE, and vinyl chloride.

Keywords: *Waste pollution, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Benzene, Vinyl chloride, Minnesota, *Superfund, *Remedial action, Record of Decision, Kummer Sanitary Landfill site, Northern Township(Minnesota), Beltrami County(Minnesota), Volatile organic compounds, Ethylene/trichloro.

PB91-921548/REB PC **A08**/MF **A02**
Superfund Record of Decision (EPA Region 2): Cinnaminson Groundwater Contamination Site, Burlington County, NJ. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 172p EPA/ROD/R02-90/127
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The 400-acre Cinnaminson Groundwater Contamination site is in the townships of Cinnaminson and Delran, Burlington County, New Jersey. The site overlies a deep aquifer and a shallow aquifer, and the latter is a potential source of drinking water. Furthermore, the site lies within the Delaware River floodplain. From 1950 to 1980, municipal solid waste and other refuse were deposited in the mining pits, while mining operations continued in other site areas. In 1970, Sanitary Landfill Inc. (SLI) operated an onsite sanitary landfill in the same area, which accepted hazardous industrial waste. In 1980, the State identified improper waste disposal practices onsite, and ordered SLI to close the landfill. In 1981 as part of the closure plan, SLI capped the landfill with 18 inches of clay, installed a gas collection and venting system, and initiated ground water monitoring. Subsequent ground water studies by EPA and SLI identified onsite ground water contamination in the landfill area. Additionally, various onsite industrial operations and local area septic systems were also identified as potential sources of ground water contamination. The Record of Decision (ROD) addresses remediation of onsite contaminated ground water in the shallow and deep aquifers, and prevention of further migration of contamination into municipal wells. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes; other organics including PAHs and phenols; and metals including arsenic, chromium, and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Aquifers, Wells, Water pollution, Ground water, Benzene, Toluene, Xylenes, Aromatic polycyclic hydrocarbons, Phenols, Metals, Arsenic, Chromium, Lead, New Jersey, *Superfund, *Remedial action, Record of Decision, Cinnaminson Groundwater Contamination site, Cinnaminson Township(New Jersey), Delran Township(New Jersey), Burlington County(New Jersey), Volatile organic compounds.

PB91-921549/REB PC **A06/MF A02**
Superfund Record of Decision (EPA Region 2): Syosset Landfill, Nassau County, Syosset, NY. (First Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 118p EPA/ROD/R02-90/107
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The 35-acre Syosset Landfill site is a closed municipal landfill in Syosset, Oyster Bay, New York. From 1933 to 1975, commercial, industrial, residential, demolition, and agricultural wastes, sludge, and ash were disposed of in the onsite landfill. Typical wastes included heavy metals, solvents, organics, oils, sludges, and metal hydroxides. The county closed the landfill in 1975 because of suspected ground water contamination. Subsequent studies have confirmed ground water contamination beneath and downgradient of the site resulting from landfill leachate. The Record of Decision (ROD) addresses source control at the site. A subsequent ROD will address onsite ground water contamination. The primary contaminants of concern affecting the soil are VOCs including benzene, PCE, TCE, and toluene; other organics; and metals including arsenic.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Benzene, Toluene, Metals, Arsenic, New York, *Superfund, *First remedial action, Record of Decision, Syosset Landfill site, Syosset(New York), Oyster Bay(New York), Ethylene/Trichloro.

PB91-921550/REB PC **A05/MF A01**
Superfund Record of Decision (EPA Region 3): Coker's Sanitation Service Landfills, Kent County, DE. (First Remedial Action), September 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 84p EPA/ROD/R03-90/096
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Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Coker's Sanitation Service Landfills site is comprised of two inactive landfills in Kent County, Delaware. Each landfill contains approximately 45,000 cubic yards of latex sludge waste in addition to the contaminated soil/waste. From 1969 to 1977, latex rubber waste sludge was disposed of at Landfill No. 1 into unlined trenches, which were topped off with local soil when nearly filled with sludge. From 1976 to 1980, latex sludge was also disposed of in lined trenches at Landfill No. 2. Excess levels of styrene and ethylbenzene were found in the waste trenches of both landfills and in the leachate collection system of landfill No. 2. The Record of Decision (ROD) addresses contamination in both landfills and in the leachate collection system at Landfill No. 2. The primary contaminants of concern affecting the soil and sludge are VOCs including benzene and metals.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Sludge, Benzene, Metals, *Superfund, *First remedial action-Final, Record of Decision, Coker's Sanitation Service Landfill sites, Kent County(Delaware).

PB91-921551/REB PC **A15**
Superfund Record of Decision: (EPA Region 2): Kentucky Avenue Wellfield Site, Town of Horseheads, Chemung County, New York (Second Remedial Action), September 28, 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 345p EPA/ROD/R02-90/129
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The Kentucky Avenue Wellfield site is an inactive municipal water supply in Horseheads, Chemung County, New York. The site overlies the Newtown Creek Aquifer, a major source of water in the area. The wellfield was established in 1962, when a water supply was needed for a food processing plant. In 1980, elevated levels of TCE were discovered in ground water, and the wellfield was closed. Subsequent onsite investigations by the State and EPA identified additional onsite contamination by VOCs and metals. In 1985 and 1986, a removal action by EPA required the connection of 56 homes that were served by the wellfield to the public water distribution system as an alternate water supply. The primary source of this contamination was determined to be from the disposal of industrial wastes in lagoons or land areas and from industrial spills, including ones from a nearby Westinghouse facility. The ROD addresses management of migration of ground water contaminants. The primary contaminants of concern affecting the ground water at VOCs including TCE and xylenes; and metals including arsenic, chromium, and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous wastes, Ground water, Water pollution, Xylenes, Metals, Arsenic, Chromium, Lead, New York, *Superfund, *Second remedial action, Kentucky Avenue Wellfield site, Horseheads(New York), Chemung County(New York), Volatile organic chemicals, Record of Decision, Ethylene/trichloro.

PB91-921552/REB PC **A05/MF A02**
Superfund Record of Decision (EPA Region 5): Wayne Reclamation and Recycling, Columbia City, Indiana (First Remedial Action), Final Report, March 30, 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Mar 90, 97p EPA/ROD/R05-90/123
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 30-acre Wayne Waste Oil site is a former oil reclamation operation and municipal landfill in Columbia City, Indiana. The site overlies a contaminated unconsolidated surficial aquifer. From 1953 to 1970, part of the site was operated as a municipal landfill. From 1975 to 1982, waste oil reclamation activities, which included the storage and handling of hazardous wastes were conducted onsite. From 1979 to 1980, an estimated 250,000 gallons of hazardous waste were illegally dumped onsite and allowed to percolate into the soil. In addition the current landfill cap is not adequate to prevent exposure of buried landfill material. Site investigations by potentially responsible parties under a Consent Order from 1988 to 1989, characterized the location and extent of remaining contaminated media, and quantified the chemical contaminants at the site. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including benzene, PCE, TCE, toluene, and xylenes; other organics including PAHs and phenols; and metals including arsenic, chromium, and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Debris, Ground water, Water pollution, Benzene, Toluene, Xylenes, Phenols, Metals, Arsenic, Chromium, Lead, Indiana, *Superfund, *First remedial action-Final, Wayne Waste Oil site, Columbia City(Indiana), Volatile organic compounds, Record of Decision.

PB91-921553/REB PC **A04/MF A01**
Superfund Record of Decision (EPA Region 5): Spiegelberg Site, Green Oak Township, Livingston County, Michigan (First Remedial Action), Final Report, June 29, 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Jun 90, 71p EPA/ROD/R05-90/126
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 115-acre Spiegelberg Landfill site is an active sand, peat, and gravel mining site in Green Oak Township, Livingston County, Michigan. From 1966 to 1977, a 2.5-acre portion of the site was used to dispose of septic, domestic, and industrial wastes, including paint sludge. Site investigations revealed two areas of concern, a paint sludge disposal area, Operable Unit I (OU I) and a ground water plume (OU II), contaminated as a result of the paint sludge disposal area. The second ROD focuses on the resulting ground water plume, which is estimated to contain 3,770,000 cubic feet of contaminated ground water. Although the contaminated ground water plume has not yet migrated beyond the site boundary, continued migration of the plume poses a threat to water supply wells north and northwest of the site. The primary contaminants of concern affecting the ground water are VOCs including benzene, toluene, and xylenes; and metals including lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Soils, Sediments, Debris, Surface water, Benzene, Toluene, Xylenes, Metals, Lead, Michigan, *Superfund, *First remedial action-Final, Spiegelberg Landfill, Green Oak Township(Michigan), Livingston County(Michigan), Record of Decision, Volatile organic compounds.

PB91-921554/REB PC **A05/MF A01**
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 22), Colorado (Sixth Remedial Action), Final Report, May 3, 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
3 May 90, 93p EPA/ROD/R08-90/041
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 17,000-acre Rocky Mountain Arsenal (RMA) (Operable Unit 22) site is a former U.S. Army chemical warfare and incendiary munitions manufacturing and assembly plant in Adams County, Colorado. Operable Unit 22 (OU22), the Complex Disposal Trenches, is one of several areas being addressed as part of the Other Contaminated Sources Interim Remedial Action. These disposal trenches are located in the 107-acre Site 36-17N in the center of the RMA. During the 1940s and 1950s, this area was the primary disposal area for solid chemical waste, contaminated tools and equipment, rejected incendiaries, and empty munitions casings. This waste was decontaminated, placed in onsite pits, and burned using fuel oil to ensure complete decontamination. Salvageable materials such as metal were sold as scrap after burning, and nonsalvageable materials were buried in onsite pits. Investigations by RMA in 1988 and 1989 identified onsite contaminated soil and a variety of buried waste, including scrap metal, concrete rubble, wood, charcoal, drums of waste chemicals, and glass vials containing unknown liquids. The main source area for the contaminant plume, however, appears to be from upgradient trenches located south of Site 36-17N. The selected interim remedial action is designed to prevent taking measures that may be incompatible with final decisions. Therefore, the ROD will not address the primary contaminants of concern affecting the soil and ground water. Remediation of contaminated media will be a component of the final site remedy.

Keywords: *Waste disposal, *Pollution control, Colorado, *Superfund, *Sixth remedial action, Rocky Mountain Arsenal, Adams County(Colorado).

PB91-921555/REB PC **A05/MF A01**
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 23), Adams County, Colorado (Seventh Remedial Action), Final Draft, March 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Mar 90, 76p EPA/ROD/R08-90/042
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 17,000-acre Rocky Mountain Arsenal (RMA) (Operable Unit 23) site is a former U.S. Army chemical warfare and incendiary munitions manufacturing and assembly plant in Adams County, Colorado. Operable Unit 23 (OU23), the Shell Section 36 Trenches, is one of several areas being addressed as part of the Other Contaminated Sources Interim Remedial Action. Approximately 31 trenches occupy an 8-acre area of Section 36 in the central portion of the RMA. From 1952 to 1965, liquid and solid waste including bulk or drummed process intermediates, off-specification product, laboratory sample filters, and other debris from the manufacture of pesticides was disposed of and buried in the trenches. Investigations by the Army from 1987 through 1989 have identified ground water contamination in a surficial unconsolidated sand aquifer underly-

ing the site. A plume of dense non-aqueous phase liquids (DNAPLs) was also detected, and is believed to have originated from the Shell Section 36 trenches. The primary contaminants of concern affecting the soil and ground water are VOCs and other organics including pesticides.

Keywords: *Waste disposal, *Pollution control, *Aquifers, Decontamination, Hazardous materials, Soils, Ground water, Pesticides, Colorado, *Superfund, *Seventh remedial action, Rocky Mountain Arsenal, Adams County(Colorado), Volatile organic compounds, Record of Decision.

PB91-921556/REB PC A06/MF A02
Superfund Record of Decision (EPA Region 2): American Thermostat Site, South Cairo, Green County, New York (Second Remedial Action), Final Report, June 29, 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Jun 90, 124p EPA/ROD/R02-90/110
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 8-acre American Thermostat (AT) site is a former thermostat assembly facility in South Cairo, Greene County, New York. From 1954 to 1985, thermostats for small appliances were assembled using machine oils, lubricants, and solvents in the process. Waste chemical sludges were disposed of directly into drains and dumped onsite for dust control. In 1983, an interim consent order was signed requiring AT to clean up the site; however, this was never implemented before plant operations ceased in 1985. A 1988 Record of Decision (ROD) provided for a permanent alternate water supply for approximately 43 affected residents. The final ROD addresses remediation of all remaining contaminated media at the site. The primary contaminants of concern affecting the soil, sediment, sludge, debris, ground water, and surface water are VOCs including PCE and TCE; other organics; and metals including arsenic, chromium, and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water contamination, Ground water, Soils, Sediments, Sludge, Debris, Surface water, Metals, Arsenic, Chromium, Lead, New York, *Superfund, *Second remedial action-Final, Record of Decision, Volatile organic compounds, Ethylene/trichloro, American thermostat, South Cairo(New York), Greene County(New York).

PB91-921557/REB PC A12/MF A03
Superfund Record of Decision (EPA Region 2): Solvent Savers Site, Chenango County, New York (First Remedial Action), Final Report, September 28, 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 256p EPA/ROD/R02-90/111
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Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 13-acre Solvent Savers site is a former chemical waste recovery facility in Lincklaen, Chenango County, New York. Between 1967 and 1974, a variety of wastes including solids, liquids, and sludges from a distillation process used to recover solvents were disposed of at the facility. Concurrently, a drum reconditioning process was also operated onsite. EPA and State investigations conducted from 1981 to 1982 revealed metals, VOCs, and other organic compounds including PCBs in onsite soil, and metals and VOCs in the ground water. In 1989, EPA required seven Potentially Responsible Parties (PRPs) to conduct an extensive removal action, which included removing and/or treating all drums and the associated contaminated soil. To the extent that the work is not completed by the PRPs in a timely fashion or to the extent that any soil contamination will remain on site following completion of that work, the remedial action documented in the ROD will be implemented. The primary contaminants of concern affecting the soil, debris, and ground water are VOCs including PCE and TCE; other organics including carcinogenic and noncarcinogenic PAHs, PCBs, and phenol; and metals including arsenic, chromium, and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Soils, Debris, Aromatic polycyclic hydrocarbons, Phenol, Polichlorinated biphenyls, Metals, Arsenic, Chromium, Lead, New York, *Superfund, *First remedial action-Final, Record of Decision, Solvent savers, Lincklaen(New York), Chenango County(New York), Volatile organic compounds, Ethylen/trichloro.

PB91-921558/REB PC A13/MF A03
Superfund Record of Decision (EPA Region 2): Sayreville Landfill Site, Borough of Sayreville, Middlesex County, New Jersey (First Remedial Action), September 28, 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 286p EPA/ROD/R02-90/122
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 35-acre Sayreville Landfill site is an inactive municipal and industrial landfill in the Borough of Sayreville, Middlesex County, New Jersey. Beginning in 1971, the landfill was used to dispose of municipal and hazardous wastes, including an estimated 50 to 150 drums containing hazardous wastes. The drums were buried in a 20-acre area of the site. In 1977, landfill operations ceased, but subsequent unauthorized dumping of hazardous waste may have occurred. In 1980, a landfill closure plan was implemented by the borough, but was not properly completed. In 1981, the State excavated 30 drums containing benzene, pesticide-, and acid-contaminated liquids. The Record of Decision (ROD) addresses remediation of onsite drummed wastes. A subsequent ROD will address further source remediation (leachate) and remediation of ground and surface waters. The primary contaminants of concern affecting the soil and debris are VOCs including benzene, toluene, and xylenes; other organics including pesticides and phenols; acids; and metals including arsenic, chromium, and lead.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Debris, Benzene, Toluene, Xylenes, Pesticides, Phenol, Metals, Arsenic, Chromium, Lead, New Jersey, *Superfund, *First remedial action, Record of Decision, Sayreville Landfill site, Borough of Sayreville(New Jersey), Middlesex County(New Jersey), Volatile organic compounds.

PB91-921559/REB PC A07/MF A02
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Superfund Record of Decision (EPA Region 3): U.S. Titanium Superfund Site, Nelson County, Virginia (First Remedial Action), Final Report, November 29, 1990.
Virginia Dept. of Waste Management, Richmond.
29 Nov 90, 150p EPA/ROD/R03-90/083
Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 175-acre U.S. Titanium site, in Nelson County, Virginia, is a former titanium dioxide manufacturing plant which was operated from 1931 to 1971. Approximately 50 acres of the site will be addressed by the remedial action, including seven waste storage areas containing process wastes. These seven areas include: Area 1, a burial pit containing 16,000 cubic yards of solid ferrous sulfate (copperas); Area 2, a former copperas stockpile area; Area 3, an evaporation pond; Area 4, a 1-acre ore waste pile; Area 5, sedimentation ponds containing fine-grained sediment composed of unreacted ore, filter cake, and gypsum; Area 6, a settling pond used to recover phosphate ore; and Area 7, a drainage area, which received surface water runoff. Several of these areas lie within the 100-year floodplain of the nearby Piney River. After a large fish kill in 1979, the State ordered U.S. Titanium to bury the copperas waste from Area 2 by December 1980. The copperas waste was collected and buried in Area 1, the onsite burial pit. A supplemental remedial investigation revealed the presence of acidified soil underlying the waste storage areas that contributes to ground water contamination. The primary contaminants of concern affecting the soil, ground water, and surface water are metals including arsenic and chromium; and other inorganics including acids.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Soils, Surface water, Metals, Arsenic, Chromium, Inorganic acids, Virginia, *Superfund, *First remedial action-Final, Record of Decision, Nelson County(Virginia), U.S. titanium.

PB91-921560/REB PC A07/MF A02
Superfund Record of Decision (EPA Region 4): Coleman Evans Wood Preserving Site, Duval County, Jacksonville, Florida (First Remedial Action (Amendment)), Final Report, September 9, 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
26 Sep 90, 143p EPA/ROD/R04-90/066
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The 11-acre Coleman-Evans Wood Preserving site is a former wood treatment facility, which was operated from 1954 to the late 1980s, in the community of Whitehouse, Duval County, Florida. Prior to 1970, wastewater from the facility was precipated and discharged to the onsite drainage ditch. The precipitated sludge was deposited into two unlined pits until 1970, when the sludge was stored in tanks. The wastewater treatment process was also enhanced in 1970 with lime precipitation and chlorination. In 1980, onsite ground water contamination was detected and activated charcoal filters were added to the treatment process to remove organics. The primary contaminant in onsite soil and ground water has been identified as pentachlorophenol (PCP). The highest areas of PCP concentration were in the vicinity of onsite chemical tanks and the unlined pit areas. In 1985, EPA conducted an emergency response, which included excavating and disposing of pit material offsite and filling excavated areas with clean fill. The Record of Decision (ROD) amends a 1986 ROD, which documented the selection of incineration for an estimated 9,000 cubic yards of contaminated soil. Since that time, additional studies during the remedial design phase indicated that there are approximately 27,000 cubic yards of contaminated soil. Based on the excessive volume of soil and the high cost of incineration, treatability studies were conducted and an alternative source control treatment was selected. The primary contaminants of concern affecting the soil, sediment, and ground water are organics including PCP and metals.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Water pollution, Ground water, Soils, Sediments, Pentachlorophenol, Metals, Florida, *Superfund, *First remedial action-Final(Amendment), Record of Decision, Whitehouse(Florida), Duval County(Florida), PCP.

PB91-921561/REB PC A11/MF A03
Superfund Record of Decision (EPA Region 4): Lewisburg Dump Site, Lewisburg, Marshall County, Tennessee (First Remedial Action), Final Report, September 19, 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
19 Sep 90, 235p EPA/ROD/R04-90/069
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Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 20-acre Lewisburg Dump site includes a 4-acre abandoned landfill developed in an abandoned 6-acre limestone quarry in Lewisburg, Marshall County, Tennessee. The municipally-owned and operated site began landfilling operations between 1963 and 1969, and a variety of residential and industrial wastes, including solvents and metallic wastes were landfilled onsite. In 1977, the State approved plans for interim maintenance and final closure of the dump. In 1977, the waste was covered with soil as part of the preliminary closure activities. The Record of Decision (ROD) addresses the contaminated soil and debris present at the site in the landfill and in the quarry pond, and provides for protection of the ground water, and sediment

from further contamination. The primary contaminants of concern affecting the soil and debris are organics including bis(2-ethylhexyl)phthalate (DEHP); and metals including aluminum, barium, copper, zinc, and manganese.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soil, Debris, Metals, Aluminum, Barium, Copper, Zinc, Manganese, Tennessee, *Superfund, *First remedial action-Final, Record of Decision, Lewisburg(Tennessee), Marshall County(Tennessee), Lewisburg Dump, Organics.

PB91-921562/REB PC **A05**/MF **A01**
Superfund Record of Decision (EPA Region 5): Anderson Development Company Site, Adrian, Michigan (First Remedial Action), Final Report, September 28, 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 84p EPA/ROD/R05-90/137
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 12.5-acre Anderson Development site is an active chemical manufacturing facility in Adrian, Madison Township, Lenawee County, Michigan. The site is in a 40-acre industrial park, and is comprised of several areas of contamination that exceed health-based levels, including a 0.5-acre former process wastewater pretreatment lagoon containing lagoon sludge, clay underlying the lagoon, and a small quantity of soil near the lagoon. From 1970 to 1979, the plant produced 4,4-methylene bis(2-chloroaniline) (MBOCA), a hardening agent for the production of polyurethane plastics. Process wastewater was discharged directly to surface water until 1973, when it was discharged to a publicly owned treatment works (POTW). In 1979, the State ordered the POTW not to accept the waste stream because of the decreased efficiency of the POTW resulting from MBOCA. In 1980 and 1981, the site owner and the State performed a cleanup action of all contaminated site areas with levels of MBOCA above 1 ppm. This included decontaminating the plant, sweeping streets, shampooing/vacuuming residential carpet, and removing some surface soil. The Record of Decision (ROD) addresses the remediation of the pretreatment lagoon area. The primary contaminants of concern affecting soil and lagoon sludge are organics, namely MBOCA and its degradation products.

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Lagoons, Sludge, Soil, Water pollution, Michigan, *Superfund, *First remedial action-Final, Anderson Development Company, Adrian(Michigan), Madison Township(Michigan), Lenawee County(Michigan), Organics, MBOCA, Record of Decision.

PB91-921563/REB PC **A08**/MF **A02**
Superfund Record of Decision (EPA Region 6): Rogers Road Municipal Landfill, Pulaski County, Arkansas (First Remedial Action), Final Report, September 27, 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Sep 90, 175p EPA/ROD/R06-90/063
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 10-acre Rogers Road Municipal Landfill site is an inactive landfill in a residential and agricultural area in Pulaski County, outside the city limits of Jacksonville, Arkansas. From 1953 until 1974, approximately one half of the site was used intermittently as a municipal waste disposal facility. Specific waste types and quantities are unknown. In addition, chemical waste materials probably originating from the nearby Vertac Chemical Corporation, including herbicides and associated dioxin impurities, have been disposed of at the site. Vertac Chemical Corporation wastes were also disposed of at the Jacksonville Municipal Landfill Superfund site, which is 1/2 mile east of the site. To achieve economies of scale, the two sites will be remediated concurrently, including excavating highly contaminated wastes and soil, and transporting these to Vertac for final treatment and disposition. The primary contaminants of concern affecting the soil and debris are organics including dioxin/furan (2,3,7,8-TCDD), the pesticide dieldrin, and herbicide compounds (2,4,5-T, 2,4-D, and 2,4,5-TP).

Keywords: *Waste disposal, *Pollution control, Decontamination, Hazardous materials, Soils, Debris, Dieldrin, Dioxin, Herbicides, Furans, Arkansas, *Superfund, *First remedial action-Final, Record of Decision, Rogers Road Municipal Landfill site, Pulaski County(Arkansas).

PB91-921564/REB PC **A06**/MF **A02**
Superfund Record of Decision (EPA Region 7): Weldon Spring Quarry/Plant/Pits (USDOE), Weldon Spring, MO. (Second Remedial Action), September 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Sep 90, 118p EPA/ROD/R07-90/043
Paper copy available on Standing Order, deposit account required (minimum deposit $150 U.S., Canada, and Mexico; all others $300). Single copies also available in paper copy or microfiche.

The 226-acre Weldon Spring Quarry/Plant/Pits (USDOE) site is a former ordnance works and chemical plant near the city of Weldon Spring in St. Charles County, Missouri. The site is divided into two noncontiguous areas: a 217-acre chemical plant area, comprised of various buildings, ponds and four raffinate pits, and a 9-acre quarry, which forms a valley wall at the edge of the Missouri River floodplain. Since the early 1940s, the site has been used by various government agencies for chemical and ordnance processing with chemical and radioactive waste disposal in the quarry. From 1941 to 1946, the site was an Army ordnance works used for the production of trinitrotoluene (TNT) and dinitrotoluene (DNT) explosives. The selected interim remedial action for the site includes excavating an estimated 95,000 cubic yards of chemically and radioactively contaminated bulk wastes from the quarry and temporarily storing the wastes onsite in the chemical plant area; and implementing site access restrictions. The estimated total cost for the remedial action is $11,000,000.

Keywords: *Ordnance, *Hazardous materials, *Waste disposal, *Pollution control, Chemical industry, Quarries, Radioactive wastes, Soils, Water treatment, Volatile organic compounds, Storage, Trinitrotoluene, Thorium, Uranium, Sludge, Polycyclic aromatic hydrocarbons, Arsenic, Lead(Metal), Excavation, *Superfund, Record of Decision, *Weldon Spring(Missouri), Saint Charles County(Missouri), Polychlorinated biphenyl, Second Remedial Action.

DE91014097/REB PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Characterizing soils for hazardous waste site assessments.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
R. P. Breckenridge, J. F. Keck, and J. R. Williams.
1991, 26p EPA-600/8-91/008, MISC-91025
Contract AC07-76ID01570
Sponsored by Department of Energy, Washington, DC.

The purpose of this paper is to provide guidance to Remedial Project Managers (RPM) and On-Scene Coordinators (OSC) concerning soil characterization data types required for decision-making in the CERCLA RI/FS process related to risk assessment and remedial alternative evaluation for contaminated soils. The information presented in this paper is a compilation of current information from the literature and from experience combined to meet the purpose of this paper. This paper addresses two concerns related to soil characterization for CERCLA remedial response. The first concern is the applicability of traditional soil classification methods to CERCLA soil characterization. The second is the identification of soil characterization data types required for CERCLA risk assessment and analysis of remedial alternatives. These concerns are related, in that the Data Quality Objective (DQO) process addresses both. The DQO process was developed, in part, to assist CERCLA decision-makers in identifying the data types, data quality, and data quantity required to support decisions that must be made during the RI/FS process. This process as it relates to CERCLA soil characterization is discussed in the Data Quality Objective section of this paper. 99 refs., 2 figs., 4 tabs.

Keywords: Ground Water, *Remedial Action, Soils, Bulk Density, Climates, Contamination, Erosion, *Hazardous Materials, Hydraulic Conductivity, Information Dissemination, PH Value, Particle Size, Permeability, Porosity, Risk Assessment, Site Characterization, Stratigraphy, Superfund, Texture, EDB/054000, EDB/053000, EDB/990300, *Remedial Project Managers, *On-scene Coordinates, *Soil characterization, *Waste management.

DE91016758/REB PC **A03**/MF **A01**
Ground-Water Issue: Soil sampling and analysis for volatile organic compounds.
Environmental Monitoring Systems Lab., Las Vegas, NV.
T. E. Lewis, A. B. Crockett, R. L. Siegrist, and K. Zarrabi. Feb 91, 34p EPA-540/4-91/001

The Regional Superfund Ground Water Forum is a group of ground-water scientists that represents EPA's Regional Superfund Offices. The forum was organized to exchange up-to-date information related to groundwater remediation at Superfund sites. Sampling of soils for volatile organic compounds (VOCs) is an issue identified by the Ground Water Forum as a concern of Superfund decision makers. Concerns over data quality have raised many questions related to sampling soils for VOCs. This paper was prepared in response to some of these questions and concerns expressed by Remedial Project Managers (RPMs) and On-Scene Coordinators (OSCs). 53 refs., 6 figs., 12 tabs.

Keywords: *Organic Compounds, *Soils, *US EPA, Equipment, Physical Properties, Recommendations, Sampling, Volatile Matter, EDB/540220, EDB/400102, *Land pollution, *Water pollution control, *Remedial action, Ground water, Superfund.

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PLEASE *DO* USE THE MEDIA CODES AT THE ENDS OF THE ORDER NUMBERS WHEN ORDERING. THE INFORMATION THEY PROVIDE IS VERY HELPFUL TO NTIS.

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Superfund Record of Decision (EPA Region 3): Croyden TCE Site, Bristol Township, Bucks County, PA. (Second Remedial Action), June 1990.
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PB91-921215/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Delaware.
PB91-921216/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Florida.
PB91-921217/REB 91-01 PC **A07**/MF **A01**

National Priorities List Sites: Georgia.
PB91-921218/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Hawaii.
PB91-921219/REB 91-01 PC **A03**/MF **A01**

National Priorities List Sites: Idaho.
PB91-921220/REB 91-01 PC **A03**/MF **A01**

National Priorities List Sites: Illinois.
PB91-921221/REB 91-01 PC **A06**/MF **A01**

National Priorities List Sites: Indiana.
PB91-921222/REB 91-01 PC **A06**/MF **A01**

National Priorities List Sites: Iowa.
PB91-921223/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Kansas.
PB91-921224/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Kentucky.
PB91-921225/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Louisiana.
PB91-921226/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Maine.
PB91-921227/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Maryland.
PB91-921228/REB 91-01 PC **A03**/MF **A01**

National Priorities List Sites: Massachusetts.
PB91-921229/REB 91-01 PC **A05**/MF **A01**

National Priorities List Sites: Michigan.
PB91-921230/REB 91-01 PC **A10**/MF **A02**

National Priorities List Sites: Minnesota.
PB91-921231/REB 91-01 PC **A06**/MF **A01**

National Priorities List Sites: Mississippi.
PB91-921232/REB 91-01 PC **A03**/MF **A01**

National Priorities List Sites: Missouri.
PB91-921233/REB 91-01 PC **A05**/MF **A01**

National Priorities List Sites: Montana.
PB91-921234/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: New Jersey.
PB91-921235/REB 91-01 PC **A13**/MF **A02**

National Priorities List Sites: Nebraska.
PB91-921236/REB 91-01 PC **A03**/MF **A01**

National Priorities List Sites: New Hampshire.
PB91-921237/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: New Mexico.
PB91-921238/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: New York.
PB91-921239/REB 91-01 PC **A10**/MF **A02**

National Priorities List Sites: North Carolina.
PB91-921240/REB 91-01 PC **A05**/MF **A01**

National Priorities List Sites: North and South Dakota.
PB91-921241/REB 91-01 PC **A03**/MF **A01**

National Priorities List Sites: Ohio.
PB91-921242/REB 91-01 PC **A05**/MF **A01**

National Priorities List Sites: Oklahoma.
PB91-921243/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Oregon.
PB91-921244/REB 91-01 PC **A03**/MF **A01**

National Priorities List Sites: Pennsylvania.
PB91-921245/REB 91-01 PC **A11**/MF **A02**

National Priorities List Sites: Rhode Island.
PB91-921246/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: South Carolina.
PB91-921247/REB 91-01 PC **A05**/MF **A01**

National Priorities List Sites: Tennessee.
PB91-921248/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Texas.
PB91-921249/REB 91-01 PC **A05**/MF **A01**

National Priorities List Sites: Utah.
PB91-921250/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Vermont.
PB91-921251/REB 91-01 PC **A03**/MF **A01**

National Priorities List Sites: Virginia.
PB91-921252/REB 91-01 PC **A04**/MF **A01**

National Priorities List Sites: Washington.
PB91-921253/REB 91-01 PC **A07**/MF **A01**

National Priorities List Sites: West Virginia.
PB91-921254/REB 91-01 PC **A03**/MF **A01**

National Priorities List Sites: Wisconsin.
PB91-921255/REB 91-01 PC **A06**/MF **A01**

National Priorities List Sites: Wyoming.
PB91-921256/REB 91-01 PC **A03**/MF **A01**

National Priorities List Sites: Puerto Rico.
PB91-921257/REB 91-01 PC **A03**/MF **A01**

National Priorities List Sites: American Samoa, Guam and Trust Territories.
PB91-921258/REB 91-01 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 10): Teledyne Wah Chang, Albany, OR. (First Remedial Action), December 1989.
PB91-921414/REB 91-01 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): Sarney Farm, Amenia, Dutchess County, NY. (First Remedial Action), September 1990.
PB91-921422/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 2): Sealand Restoration Site, Town of Lisbon, St. Lawrence County, NY. (First Remedial Action), September 1990.
PB91-921424/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): FAA Technical Center, Area 20A - Salvage Yard, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921425/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): Woodland Township Route 72 and Route 532 Dump Sites, Burlington County, Chatsworth, NJ. (First Remedial Action), May 1990.
PB91-921426/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): Hooker Chemical/Ruco Polymer Site, Hicksville, NY. (First Remedial Action), September 1990.
PB91-921427/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 2): Montclair/West Orange Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921431/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): Avtex Fibers Site, Front Royal, VA. (Second Remedial Action), September 1990.
PB91-921432/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): Fike/Artel Chemical Site, Nitro, WV. (Second Remedial Action), September 1990.
PB91-921433/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 3): Keystone Sanitation Landfill Site, Adams County, Union Township, PA. (First Remedial Action), September 1990.
PB91-921434/REB 91-04 PC **A07**/MF **A01**

Superfund Record of Decision (EPA Region 3): Croyden TCE Site, Bristol Township, Bucks County, PA. (Second Remedial Action), June 1990.
PB91-921435/REB 91-04 PC **A07**/MF **A01**

Superfund Record of Decision (EPA Region 2): Glen Ridge Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921436/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): Brown's Battery Breaking Site, Tilden Township, PA. (First Remedial Action), September 1990.
PB91-921437/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 3): Butz Landfill Superfund Site, Jackson Township, Monroe County, PA. (First Remedial Action), September 1990.
PB91-921438/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 3): Sand, Gravel and Stone Site, Elkton, MD. (Second Remedial Action), September 1990.
PB91-921439/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 3): Osborne Landfill Site, Pine Township, Mercer County, PA. (First Remedial Action), September 1990.
PB91-921440/REB 91-04 PC **A09**/MF **A01**

Superfund Record of Decision (EPA Region 3): East Mt. Zion Landfill, Springettsbury Township, York County, PA. (First Remedial Action), September 1990.
PB91-921441/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Harris/Palm Bay Facility, Palm Bay, Brevard County, FL. (First Remedial Action), June 1990.
PB91-921442/REB 91-04 PC **A06**/MF **A01**

Superfund Record of Decision (EPA Region 4): North Hollywood Dump, TN. (First Remedial Action), September 1990.
PB91-921443/REB 91-04 PC **A13**/MF **A02**

Superfund Record of Decision (EPA Region 4): Dubose Oil Products Site, Cantonment, Escambia County, FL. (First Remedial Action), March 1990.
PB91-921444/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): Kassouf-Kimerling Battery Site, Tampa, Hillsborough County, FL. (Second Remedial Action), March 1990.
PB91-921445/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): National Starch and Chemical Corporation Site, Salisbury, NC. (Second Remedial Action), September 1990.
PB91-921446/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 4): SCRDI Bluff Road Site, Columbia, Richland County, SC. (First Remedial Action), September 1990.
PB91-921447/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 4): Pickettville Road Landfill, Jacksonville, Duval County, FL. (First Remedial Action), September 1990.
PB91-921448/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Cabot Carbon/Koppers Site, Gainesville, Alachua County, FL. (First Remedial Action), September 1990.
PB91-921449/REB 91-04 PC **A07**/MF **A01**

Superfund Record of Decision (EPA Region 5): Tri-State Plating, Columbus, IN. (First Remedial Action), March 1990.
PB91-921450/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): Fisher-Calo Chem, Kingsbury, IN. (First Remedial Action), August 1990.
PB91-921451/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Wheeler Pit Site, La Prairie Township, WI. (First Remedial Action), September 1990.
PB91-921452/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Pristine, Inc., Reading, OH. (First Remedial Action), March 1990. (Amendment).
PB91-921453/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): K and L Landfill, Kalamazoo, MI. (First Remedial Action), September 1990.
PB91-921454/REB 91-04 PC **A02**/MF **A01**

Superfund Record of Decision (EPA Region 5): Ott/Story/Cordova Chemical Site, North Muskegon, MI. (Second Remedial Action), September 1990.
PB91-921455/REB 91-04 PC **A05**/MF **A02**

Superfund Record of Decision (EPA Region 5): Naval Industrial Reserve Ordnance Plant, Fridley, MN. (First Remedial Action), September 1990.
PB91-921456/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): National Presto Industries, Eau Claire, WI. (First Remedial Action), August 1990.
PB91-921457/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): St. Louis River/Interlake/Duluth Tar Site, Duluth, MN. (First Remedial Action), September 1990.
PB91-921458/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Clare Water Supply, Clare County, MI. (First Remedial Action), August 1990.
PB91-921459/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): University of Minnesota Rosemount Research Center, MN. (First Remedial Action), June 1990.
PB91-921460/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 5): Moss-American Kerr-McGee Oil Site, Milwaukee, WI. (First Remedial Action), September 1990.
PB91-921461/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 5): Springfield Township Dump Site, Oakland County, MI. (First Remedial Action), September 1990.
PB91-921462/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 5): Metamora Landfill, Metamora, Lapeer County, MI. (Second Remedial Action), September 1990.
PB91-921463/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Hunts Disposal Landfill Site, Town of Caledonia, WI. (First Remedial Action), September 1990.
PB91-921464/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Union Scrap Iron Metal, Hennepin County, Minneapolis, MN. (First Remedial Action), March 1990.
PB91-921465/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): Bofors-Nobel Site, Muskegon, MI. (First Remedial Action), September 1990.
PB91-921466/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Tenth Street Dump/Junkyard, Oklahoma City, OK. (First Remedial Action), September 1990.
PB91-921469/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination FAR-MAR-CO Subsite, Hastings Irrigation Pipe Company TCA Soils Operable Unit, Hastings, NE. (Second Remedial Action), September 1990.
PB91-921473/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 7): Lindsay Manufacturing Company, Lindsay, NE. (First Remedial Action), September 1990.
PB91-921474/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 7): Midwest Manufacturing/North Farm Site, Midwest Operable Unit, Kellogg, IA. (First Remedial Action), September 1990.
PB91-921475/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 7): Fairfield Coal Gasification Site, Fairfield, IA. (First Remedial Action), September 1990.
PB91-921478/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Sand Creek Industrial Site, Commerce City, CO. (Second Remedial Action), September 1990.
PB91-921479/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Ogden Defense Depot (Operable Unit 2), Weber County, Ogden, UT. (First Remedial Action), September 1990.
PB91-921480/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Mystery Bridge at Highway 20, Natrona County, WY. (First Remedial Action), September 1990.
PB91-921481/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 8): Monticello Mill Tailings Site, San Juan County, UT. (First Remedial Action), August 1990.
PB91-921482/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Martin Marietta Astronautics Group Site, Waterton, CO. (First Remedial Action), September 1990.
PB91-921483/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 16), CO. (Second Remedial Action), February 1990.
PB91-921484/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 18), CO. (Third Remedial Action), February 1990.
PB91-921485/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 20), CO. (Fifth Remedial Action), March 1990.
PB91-921486/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Flats Plant (DOE), Northern Jefferson County, CO. (First Remedial Action), January 1990.
PB91-921487/REB 91-04 PC **A19**/MF **A04**

Superfund Record of Decision (EPA Region 8): Sharon Steel (Midvale Tailings), Midvale, UT. (First Remedial Action), September 1990.
PB91-921488/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 9): J. H. Baxter Superfund Site, Weed, CA. (First Remedial Action), September 1990.
PB91-921489/REB 91-04 PC **A10**/MF **A03**

Superfund Record of Decision (EPA Region 9): Stringfellow Hazardous Waste Site, Riverside County, CA. (Fourth Remedial Action), September 1990.
PB91-921490/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 9): Louisiana-Pacific Corporation, Oroville, CA. (First Remedial Action), September 1990.
PB91-921491/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 9): Applied Materials, Inc., Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921492/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 9): Operating Industries, Inc., Monterey Park, CA. (Third Remedial Action), September 1990 (Amendment).
PB91-921493/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 10): FMC Pesticide Formulation Facility, Yakima, WA. (First Remedial Action), September 1990.
PB91-921494/REB 91-04 PC **A04**/MF **A01**

CLEANUP OPERATION

Superfund Record of Decision (EPA Region 5): Rose Township, Oakland County, Michigan. (First Remedial Action), September 18, 1989.
PB91-921412/REB 91-01 PC **A03**/MF **A01**

CLEANUP OPERATIONS

Protocol for Testing Bioremediation Products against Weathered Alaskan Crude Oil.
PB91-137018/REB 91-01 PC **A03**/MF **A01**

Workshop on Innovative Technologies for Treatment of Contaminated Sediments. Held in Cincinnati, Ohio on June 13-14, 1990. Summary Report.
PB91-148296/REB 91-01 PC **A04**/MF **A01**

Soil Bioventing Demonstration Project.
PB91-162628/REB 91-01 PC **A03**/MF **A01**

Closure of a Dioxin Incineration Facility.
PB91-176818/REB 91-01 PC **A02**/MF **A01**

Evaluating the Effectiveness of Ground Water Extraction Systems.
PB91-177386/REB 91-01 PC **A02**/MF **A01**

Remediation of Sites Contaminated with TCE.
PB91-182311/REB 91-01 PC **A03**/MF **A01**

Development and Demonstration of a Pilot-Scale Debris Washing System.
PB91-196626/REB 91-01 PC **A03**/MF **A01**

Evaluation of Soil Washing Technology: Results of Bench-Scale Experiments on Petroleum-Fuels Contaminated Soils.
PB91-206599/REB 91-04 PC **A06**/MF **A01**

Exxon Valdez Oil Spill. A Report to the President.
PB91-213819/REB 91-04 PC **A04**/MF **A01**

Technology Evaluation Report: Design and Development of a Pilot-Scale Debris Decontamination System. Volume 1.
PB91-231456/REB 91-04 PC **A05**/MF **A02**

Technology Evaluation Report: Design and Development of a Pilot-Scale Debris Decontamination System. Volume 2.
PB91-231464/REB 91-04 PC **A12**/MF **A03**

Advances in Hazardous Waste Site Alluvial Sampling.
PB91-233320/REB 91-04 PC **A03**/MF **A01**

Harmonization of QA Procedures for Environmental Data Operations: Development of a National Consensus Standard for Quality Assurance for Environmental Programs.
PB91-240523/REB 91-04 PC **A03**/MF **A01**

Enhancing State Superfund Capabilities: Nine-State Study.
PB91-242362/REB 91-04 PC **A12**/MF **A03**

CLEANUPS

Superfund Record of Decision (EPA Region 2): Lone Pine Landfill, Freehold Township, Monmouth County, NJ. (Second Remedial Action), September 1990.
PB91-921430/REB 91-04 PC **A05**/MF **A01**

CLEARING HOUSES

Access EPA. Clearinghouses and Hotlines.
PB90-237082/REB 91-01 PC **A03**/MF **A01**

CLIMATE

Overview of Climate Information Needs for Ecological Effects Models.
PB91-125898/REB 91-01 PC **A04**/MF **A01**

CLIMATES

Comparison of an Alternative Land Surface Parameterization with the GFDL High Resolution Climate Model.
PB91-231100/REB 91-04 PC **A03**/MF **A01**

Spatial Distribution of Precipitation Seasonality in the United States.
PB91-233510/REB 91-04 PC **A03**/MF **A01**

CLIMATIC CHANGES

Response and Feedbacks of Forest Systems to Global Climate Change.
PB91-104240/REB 91-01 PC **A10**/MF **A02**

Effects of UV-B and Global Climate Change on Rice Research Plan.
PB91-109983/REB 91-01 PC **A04**/MF **A01**

Global Climatic Issues in the Coastal Wider Caribbean Region.
PB91-116939/REB 91-01 PC **A03**/MF **A01**

Overview of Climate Information Needs for Ecological Effects Models.
PB91-125898/REB 91-01 PC **A04**/MF **A01**

Regional Forest Management Planning in the Southern United States.
PB91-129197/REB 91-01 PC **A03**/MF **A01**

Responses and Feedback to Global Forests to Climate Change.
PB91-129734/REB 91-01 PC **A03**/MF **A01**

Climatically Induced Rapid Acidification of a Softwater Seepage Lake.
PB91-146514/REB 91-01 PC **A01**/MF **A01**

Global Climate Change: Policy Implications for Fisheries.
PB91-171611/REB 91-01 PC **A02**/MF **A01**

Climatic Sensitivity of California Water Resources.
PB91-177378/REB 91-01 PC **A03**/MF **A01**

EPA's Global Climate Change Program. Program Plan for Methane Emissions from Landfills and Other Waste Disposal Facilities.
PB91-182667/REB 91-01 PC **A03**/MF **A01**

Changing Solar Ultraviolet Climate and the Ecological Consequences for Higher Plants.
PB91-196204/REB 91-01 PC **A02**/MF **A01**

Proceedings: EPA/NGA Workshop on Global Climate and State Actions. Held in Research Triangle Park, North Carolina on December 3-4, 1990.
PB91-219105/REB 91-04 PC **A03**/MF **A01**

EPA's Global Climate Change Program: Global Landfill Methane.
PB91-223230/REB 91-04 PC **A03**/MF **A01**

Continental Scale Biome Responses to Climatic Change.
PB91-226456/REB 91-04 PC **A03**/MF **A01**

Toward a Rule-Based Biome Model.
PB91-226472/REB 91-04 PC **A03**/MF **A01**

Climate Change and Global Isoprene Emissions.
PB91-226480/REB 91-04 PC **A03**/MF **A01**

In the Footsteps of Robert Marshall: Proposed Research of White Spruce Growth and Movement at the Tree Limit, Central Brooks Range, Alaska.
PB91-226514/REB 91-04 PC **A03**/MF **A01**

Sensitivity of the Regional Water Balance in the Columbia River Basin to Climate Variability: Application of a Spatially Distributed Water Balance Model.
PB91-226522/REB 91-04 PC **A04**/MF **A01**

Carbon Sequestration in Soils and Global Climatic Change.
PB91-226530/REB 91-04 PC **A03**/MF **A01**

Temperature Scenario Development Using Regression Methods. Phase 2.
PB91-231506/REB 91-04 PC **A04**/MF **A01**

Forestation and Forest Management Options and Their Costs at the Site Level.
PB91-233270/REB 91-04 PC **A03**/MF **A01**

Development of Impact-Oriented Climate Scenarios.
PB91-233486/REB 91-04 PC **A03**/MF **A01**

CLIMATOLOGY

Climate Data and Analysis for the New England Forest Health Monitoring Project (NEFHM/EMAP Forests).
PB91-196071/REB 91-01 PC **A03**/MF **A01**

CLINICAL CHEMISTRY

Brominated Dioxins and Dibenzofurans in Human Adipose Tissue.
PB91-103507/REB 91-01 PC **A04**/MF **A01**

Improved Flow Cytometric Assay for Somatic Mutations at the Glycophorin A Locus in Humans.
PB91-117093/REB 91-01 PC **A03**/MF **A01**

CLOMIPHENE

Validation of Protocols for Assessing Early Pregnancy Failure in the Rat: Clomiphene Citrate.
PB91-207118/REB 91-04 PC **A03**/MF **A01**

CLONAL DIVERSITY

Genetic Variation in Clonal Vertebrates Detected by Simple-Sequence DNA Fingerprinting.
PB91-163972/REB 91-01 PC **A02**/MF **A01**

CLOUD SEEDING

Meta-Analytic Reappraisal of Statistical Results in the Environmental Sciences: The Case of a Hydrological Effect of Cloud Seeding.
PB91-146613/REB 91-01 PC **A02**/MF **A01**

CLOUDS (METEOROLOGY)

Data Users Guide to the Mountain Cloud Chemistry Project.
PB91-168484/REB 91-01 PC **A04**/MF **A01**

COAGULATION

Modal Aerosol Dynamics Modeling.
PB91-161729/REB 91-01 PC **A13**/MF **A02**

COAL

Calcination and Sintering of Sorbents during Boiler Injection for Dry Sulfur Dioxide Control.
PB91-136648/REB 91-01 PC **A03**/MF **A01**

COAL COMBUSTION

Nitrous Oxide Emissions from Fossil Fuel Combustion.
PB91-171496/REB 91-01 PC **A03**/MF **A01**

COAL FIRED POWER PLANTS

Integrated Air Pollution Control System, Version 4.0. Volume 1. User's Guide.
PB91-133512/REB 91-01 PC **A04**/MF **A01**

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PB91-133520/REB 91-01 PC **A10**/MF **A02**

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PB91-133538/REB 91-01 PC **A07**/MF **A01**

Retrofit Costs of SO2 and NOx Control at 200 U.S. Coal-Fired Power Plants.
PB91-226381/REB 91-04 PC **A03**/MF **A01**

Integrated Air Pollution Control System (IAPCS), Executable Model (Version 4.0) (for Microcomputers).
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Superfund Record of Decision (EPA Region 4): Zellwood Groundwater Contamination Site, (Operable Unit 1), Orange County, Zellwood, FL. (First Remedial Action), (Amendment), March 1990.
PB91-921508/REB 91-04 PC **A04**/MF **A01**

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Superfund Record of Decision (EPA Region 4): Hipps Road Landfill Site, Duval County, Jacksonville, FL. (First Remedial Action), (Amendment), September 1990.
PB91-921506/REB 91-04 PC **A11**/MF **A03**

FIRST REMEDIAL ACTION-FINAL
Superfund Record of Decision (EPA Region 2): M and T DeLisa Landfill Site, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921429/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 2): Mannheim Avenue Dump Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921495/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): Pomona Oaks Well Contamination Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921497/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Schuylkill Metal, Hillsborough County, Plant City, FL. (First Remedial Action), September 1990.
PB91-921501/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 4): 62nd Street Dump, Hillsborough County, Tampa, FL. (First Remedial Action), June 1990.
PB91-921507/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Crystal Chemical Site, Houston, TX. (First Remedial Action), September 1990.
PB91-921510/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 7): White Farm Equipment Company Dump Site, Floyd County, Charles City, IA. (First Remedial Action), September 1990.
PB91-921514/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): Munisport Landfill Site, Dade County, North Miami, FL. (First Remedial Action), July 1990.
PB91-921525/REB 91-04 PC **A09**/MF **A02**

Superfund Record of Decision (EPA Region 4): City Industries, Winter Park, FL. (First Remedial Action), March 1990.
PB91-921530/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 10): Fort Lewis Logistics Center, Pierce County, Fort Lewis, WA. (First Remedial Action), September 1990.
PB91-921542/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): Coker's Sanitation Service Landfills, Kent County, DE. (First Remedial Action), September 1990.
PB91-921550/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Wayne Reclamation and Recycling, Columbia City, Indiana (First Remedial Action), Final Report, March 30, 1990.
PB91-921552/REB 91-04 PC **A05**/MF **A02**

Superfund Record of Decision (EPA Region 5): Spiegelberg Site, Green Oak Township, Livingston County, Michigan (First Remedial Action), Final Report, June 29, 1990.
PB91-921553/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): Solvent Savers Site, Chenango County, New York (First Remedial Action), Final Report, September 28, 1990.
PB91-921557/REB 91-04 PC **A12**/MF **A03**

Superfund Record of Decision (EPA Region 3): U.S. Titanium Superfund Site, Nelson County, Virginia (First Remedial Action), Final Report, November 29, 1990.
PB91-921559/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 4): Lewisburg Dump Site, Lewisburg, Marshall County, Tennessee (First Remedial Action), Final Report, September 19, 1990.
PB91-921561/REB 91-04 PC **A11**/MF **A03**

Superfund Record of Decision (EPA Region 5): Anderson Development Company Site, Adrian, Michigan (First Remedial Action), Final Report, September 28, 1990.
PB91-921562/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Rogers Road Municipal Landfill, Pulaski County, Arkansas (First Remedial Action), Final Report, September 27, 1990.
PB91-921563/REB 91-04 PC **A08**/MF **A02**

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Superfund Record of Decision (EPA Region 4): Coleman Evans Wood Preserving Site, Duval County, Jacksonville, Florida (First Remedial Action (Amendment)), Final Report, September 9, 1990.
PB91-921560/REB 91-04 PC **A07**/MF **A02**

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Fish Acute Toxicity Syndromes: Application to the Development of Mechanism-Specific QSARS.
PB91-162529/REB 91-01 PC **A03**/MF **A01**

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PB91-206946/REB 91-04 PC **A02**/MF **A01**

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PB91-115915/REB 91-01 PC **A02**/MF **A01**

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PB91-136614/REB 91-01 PC **A01**/MF **A01**

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PB91-921511/REB 91-04 PC **A06**/MF **A02**

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PB91-144956/REB 91-01 PC **A03**/MF **A01**

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PB91-921456/REB 91-04 PC **A04**/MF **A01**

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Superfund Record of Decision (EPA Region 3): Avtex Fibers Site, Front Royal, VA. (Second Remedial Action), September 1990.
PB91-921432/REB 91-04 PC **A04**/MF **A01**

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Best Demonstrated Control Technology for Graphic Arts.
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Superfund Record of Decision (EPA Region 5): St. Louis River/Interlake/Duluth Tar Site, Duluth, MN. (First Remedial Action), September 1990.
PB91-921458/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Clare Water Supply, Clare County, MI. (First Remedial Action), August 1990.
PB91-921459/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): University of Minnesota Rosemount Research Center, MN. (First Remedial Action), June 1990.
PB91-921460/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 5): Moss-American Kerr-McGee Oil Site, Milwaukee, WI. (First Remedial Action), September 1990.
PB91-921461/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 5): Springfield Township Dump Site, Oakland County, MI. (First Remedial Action), September 1990.
PB91-921462/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 5): Metamora Landfill, Metamora, Lapeer County, MI. (Second Remedial Action), September 1990.
PB91-921463/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Hunts Disposal Landfill Site, Town of Caledonia, WI. (First Remedial Action), September 1990.
PB91-921464/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Union Scrap Iron Metal, Hennepin County, Minneapolis, MN. (First Remedial Action), March 1990.
PB91-921465/REB 91-04 PC **A03**/MF **A01**

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PB91-921466/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Tenth Street Dump/Junkyard, Oklahoma City, OK. (First Remedial Action), September 1990.
PB91-921469/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination FAR-MAR-CO Subsite, Hastings Irrigation Pipe Company TCA Soils Operable Unit, Hastings, NE. (Second Remedial Action), September 1990.
PB91-921473/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 7): Lindsay Manufacturing Company, Lindsay, NE. (First Remedial Action), September 1990.
PB91-921474/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 7): Midwest Manufacturing/North Farm Site, Midwest Operable Unit, Kellogg, IA. (First Remedial Action), September 1990.
PB91-921475/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 7): Fairfield Coal Gasification Site, Fairfield, IA. (First Remedial Action), September 1990.
PB91-921478/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Sand Creek Industrial Site, Commerce City, CO. (Second Remedial Action), September 1990.
PB91-921479/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Ogden Defense Depot (Operable Unit 2), Weber County, Ogden, UT. (First Remedial Action), September 1990.
PB91-921480/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Mystery Bridge at Highway 20, Natrona County, WY. (First Remedial Action), September 1990.
PB91-921481/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 8): Monticello Mill Tailings Site, San Juan County, UT. (First Remedial Action), August 1990.
PB91-921482/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Martin Marietta Astronautics Group Site, Waterton, CO. (First Remedial Action), September 1990.
PB91-921483/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 16), CO. (Second Remedial Action), February 1990.
PB91-921484/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 18), CO. (Third Remedial Action), February 1990.
PB91-921485/REB 91-04 PC **A05**/MF **A01**

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PB91-921486/REB 91-04 PC **A04**/MF **A01**

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PB91-921487/REB 91-04 PC **A19**/MF **A04**

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PB91-921488/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 9): J. H. Baxter Superfund Site, Weed, CA. (First Remedial Action), September 1990.
PB91-921489/REB 91-04 PC **A10**/MF **A03**

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PB91-921490/REB 91-04 PC **A03**/MF **A01**

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PB91-921491/REB 91-04 PC **A05**/MF **A01**

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PB91-921493/REB 91-04 PC **A03**/MF **A01**

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Technical Note: Adsorption Capacity of GAC for Synthetic Organics.
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ISOTOPIC EXCHANGE

Isotopic Exchange between Carbon Dioxide and Ozone via O((sup 1)D) in the Stratosphere.
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MOLECULAR WEIGHT
Electron-Capture Negative Ionization Calibrants for Magnetic Sector Mass Spectrometers.
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PB91-921438/REB 91-04 PC **A03**/MF **A01**

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Toxic Release Inventory (TRI), Montana, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-506838/REB 91-04 CP **D01**

Toxic Release Inventory (TRI), Montana, 1989 (in Macintosh Excel Format) (for Microcomputers).
PB91-509364/REB 91-04 CP **D01**

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PB91-921234/REB 91-01 PC **A04**/MF **A01**

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PB91-921431/REB 91-04 PC **A04**/MF **A01**

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PB91-167692/REB 91-01 PC **A23**/MF **A03**

Proceedings of Two Highway Vehicle Emission Inventory Workshops. Held in Washington, DC. on July 19-20, 1990 and in Sacramento, CA. on August 21, 1990.
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Morphometric Study of Nasal-Pharyngeal Growth for Particle Deposition in the Rat.
PB91-109140/REB 91-01 PC **A02**/MF **A01**

Morphometric Comparison of the Nasopharyngeal Airway of Laboratory Animals and Humans.
PB91-116079/REB 91-01 PC **A03**/MF **A01**

NASSAU COUNTY (NEW YORK)
Superfund Record of Decision (EPA Region 2): Hooker Chemical/Ruco Polymer Site, Hicksville, NY. (First Remedial Action), September 1990.
PB91-921427/REB 91-04 PC **A07**/MF **A02**

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PB91-119669/REB 91-01 PC **A99**/MF **A99**

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PB91-182824/REB 91-01 PC **A03**/MF **A01**

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PB91-223149/REB 91-04 PC **A03**/MF **A01**

NAPAP Emissions Inventory (Version 2): U.S. Point Source Modelers' Inventory, 1985.
PB91-505586/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): Canadian Modelers' Point Source Data, 1985.
PB91-505594/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tape - Winter Weekday, 1985.
PB91-505602/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tape - Winter Weekday, 1985.
PB91-505610/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Winter Weekday, 1985.
PB91-505628/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tapes - Winter Weekday, 1985.
PB91-505636/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Winter Saturday, 1985.
PB91-505644/REB 91-01 CP **T03**

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NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Winter Saturday, 1985.
PB91-505669/REB 91-01 CP **T02**

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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tape, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Winter Sunday, 1985.
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PB91-505701/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Winter Sunday, 1985.
PB91-505719/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Fall Weekday, 1985.
PB91-505727/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Fall Saturday, 1985.
PB91-505735/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tape - Fall Saturday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Fall Saturday, 1985.
PB91-505750/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Fall Saturday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Fall Sunday, 1985.
PB91-505776/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tape - Fall Sunday, 1985.
PB91-505784/REB 91-01 CP **T03**

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PB91-505800/REB 91-01 CP **T02**

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PB91-505826/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Winter Sunday, 1985.
PB91-505834/REB 91-01 CP **T02**

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PB91-505867/REB 91-01 CP **T02**

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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Spring Weekday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tape - Spring Weekday, 1985.
PB91-505925/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Spring Weekday, 1985.
PB91-505933/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Spring Weekday, 1985.
PB91-505941/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Spring Saturday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Spring Saturday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Spring Saturday, 1985.
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NAPAP Emissions Enventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Spring Saturday, 1985.
PB91-505982/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Spring Sunday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Spring Sunday, 1985.
PB91-506006/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Spring Sunday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Nonmobile Sources Modelers' Tape - Spring Sunday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Summer Weekday, 1985.
PB91-506030/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Source Modelers' Tape - Summer Weekday, 1985.
PB91-506055/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Nonmobile Sources Modelers' Tape - Summer Weekday, 1985.
PB91-506063/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Summer Saturday, 1985.
PB91-506071/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Summer Saturday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Summer Saturday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Nonmobile Sources Modelers' Tape - Summer Saturday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Summer Sunday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Summer Sunday, 1985.
PB91-506139/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Summer Sunday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers; Tapes - Fall Weekday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Fall Weekday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Spring Saturday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Summer Weekday, 1985.
PB91-506048/REB 91-01 CP **T03**

NATIONAL AIR TOXICS INFORMATION CLEARINGHOUSE
Ongoing Research and Regulatory Development Projects.
PB91-161752/REB 91-01 PC **A10**/MF **A02**

NATICH Data Base Report on State, Local and EPA Air Toxics Activities.
PB91-187575/REB 91-01 PC **A99**/MF **A04**

NATIONAL AMBIENT AIR QUALITY STANDARDS
National Emission Standards for Asbestos. Background Information for Promulgated Asbestos NESHAP Revisions.
PB91-127233/REB 91-01 PC **A12**/MF **A02**

Critical Health Issues Associated with Review of the Scientific Criteria for Carbon Monoxide.
PB91-191304/REB 91-01 PC **A03**/MF **A01**

Review of the National Ambient Air Quality Standards for Lead: Assessment of Scientific and Technical Information.
PB91-206185/REB 91-01 PC **A09**/MF **A02**

NATIONAL DRY DEPOSITION NETWORK
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PB91-181784/REB 91-01 PC **A07**/MF **A01**

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Benzene Enabling Document for Standards on Benzene Transfer and Waste Operations.
PB91-161737/REB 91-01 PC **A06**/MF **A01**

NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANTS
Asbestos/NESHAP Adequately Wet Guidance.
PB91-218693/REB 91-04 PC **A03**/MF **A01**

Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance.
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NATIONAL GOVERNMENT
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PB91-145516/REB 91-01 PC **A09**/MF **A02**

Progress Toward Implementing Superfund. Fiscal Year 1989.
PB91-921204/REB 91-01 PC **A16**/MF **A02**

NATIONAL PARKS
IMPROVE Progress Report: Appendix A.
PB90-231366/REB 91-01 PC **A09**/MF **A01**

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
NPDES Compliance Monitoring Inspector Training Module: Legal Issues.
PB91-145680/REB 91-01 PC **A06**/MF **A01**

NPDES Compliance Monitoring Inspector Training Module: Biomonitoring.
PB91-145854/REB 91-01 PC **A05**/MF **A01**

Design Information Report: Sludge Management Systems.
PB91-196378/REB 91-01 PC **A02**/MF **A01**

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PROGRAM
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PB91-145870/REB 91-01 PC **A07**/MF **A01**

NATIONAL PRIMARY DRINKING WATER REGULATIONS
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PB91-225698/REB 91-04 PC **A07**/MF **A02**

NATIONAL PRIORITIES LIST
Procedures for Completion and Deletion of National Priorities List Sites (Update).
PB90-274556/REB 91-01 PC **A04**/MF **A01**

Superfund: Focusing on the Nation at Large. A Decade of Progress at National Priorities List Sites.
PB91-921207/REB 91-01 PC **A06**/MF **A01**

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PB91-921302/REB 91-01 PC **A01**/MF **A01**

NATIONAL TECHNICAL INFORMATION SERVICE
National Technical Information Service: Records of Decision Abstracts FY82-FY85.
PB91-227363/REB 91-04 PC **A08**/MF **A02**

NATRONA COUNTY (WYOMING)
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PB91-921481/REB 91-04 PC **A06**/MF **A02**

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NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Summer Weekday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Summer Sunday, 1985.
PB91-506220/REB 91-01 CP **T02**

NATURAL EMISSIONS
Estimating Lightning-Generated NOx Emissions for Regional Air Pollution Models.
PB91-131664/REB 91-01 PC **A02**/MF **A01**

Natural Emissions of Oxidant Precursors.
PB91-211334/REB 91-04 PC **A03**/MF **A01**

Current and Developing Analytical Technologies for Quantifying Biogenic Gas Emissions.
PB91-216523/REB 91-04 PC **A08**/MF **A02**

Measurement of Methane Emissions in the Plume of a Large Surface Coal Mine Using Open-Path FTIR Spectroscopy.
PB91-226415/REB 91-04 PC **A03**/MF **A01**

Climate Change and Global Isoprene Emissions.
PB91-226480/REB 91-04 PC **A03**/MF **A01**

PC-BEIS: A Personal Computer Version of the Biogenic Emissions Inventory System.
PB91-233460/REB 91-04 PC **A02**/MF **A01**

Sensitivity of Regional Ozone Modeling to Biogenic Hydrocarbons.
PB91-233528/REB 91-04 PC **A03**/MF **A01**

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PB91-242412/REB 91-04 PC **A04**/MF **A01**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Winter Weekday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. Annual Natural Particulate Sources, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Spring Saturday, 1985.
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NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Fall Sunday, 1985.
PB91-506253/REB 91-01 CP **T02**

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Assessing Pesticide Risk to Arthropod Natural Enemies Using Expert System Technology.
PB91-240465/REB 91-04 PC **A03**/MF **A01**

NATURAL ESTUARY PROGRAM
Progress in the National Estuary Program: Report to Congress.
PB91-168385/REB 91-01 PC **A03**/MF **A01**

NATURAL GAS
Natural Gas Reburning for NOx Control on a Cyclone-Fired Boiler.
PB91-223164/REB 91-04 PC **A03**/MF **A01**

Evaluation of the Acceptability of Natural Gas as a Mitigating Fuel for Utility Combustion Sources.
PB91-226449/REB 91-04 PC **A03**/MF **A01**

NATURAL KILLER CELLS
Induction of Activation Antigens on Human Natural Killer Cells Mediated Through the Fc-Gamma Receptor.
PB91-116004/REB 91-01 PC **A02**/MF **A01**

Acute, Subchronic, and Chronic Exposure to a Simulated Urban Profile of Ozone: Effects on Extrapulmonary Natural Killer Cell Activity and Lymphocyte Mitogenic Responses.
PB91-149740/REB 91-01 PC **A03**/MF **A01**

NATURAL RESOURCES
Identifying Ecological Indicators: An Environmental Monitoring and Assessment Program.
PB91-146605/REB 91-01 PC **A01**/MF **A01**

NATURAL RESOURCES MANAGEMENT
Environmental Inventory of the Christmas Bay Coastal Preserve.
PB91-230151/REB 91-04 PC **A06**/MF **A02**

Regulatory Survey for the Christmas Bay Coastal Preserve.
PB91-230185/REB 91-04 PC **A06**/MF **A02**

Regulatory Survey for the Armed Bayou Coastal Preserve.
PB91-230300/REB 91-04 PC **A06**/MF **A02**

Environmental Inventory of the Armand Bayou Coastal Preserve.
PB91-230979/REB 91-04 PC **A05**/MF **A01**

(NCLAN)NATIONAL CROP LOSS ASSESSMENT NETWORK
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PB91-144832/REB 91-01 PC **A03**/MF **A01**

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Toxic Release Inventory (TRI), Nebraska, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508846/REB 91-04 CP **D01**

Toxic Release Inventory (TRI), Nebraska, 1989 (in Macintosh Excel Format) (for Microcomputers).
PB91-509372/REB 91-04 CP **D01**

National Priorities List Sites: Nebraska.
PB91-921236/REB 91-01 PC **A03**/MF **A01**

NEOPLASMS
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PB91-109181/REB 91-01 PC **A03**/MF **A01**

Pericyte of a Teleost Fish: Ultrastructure, Position, and Role in Neoplasia as Revealed by a Fish Model.
PB91-163808/REB 91-01 PC **A02**/MF **A01**

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Assessing Pesticide Risk to Arthropod Natural Enemies Using Expert System Technology.
PB91-240465/REB 91-04 PC **A03**/MF **A01**

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Trophic Control of Lung Development by Sympathetic Neurons: Effects of Neonatal Sympathectomy with 6-Hydroxydopamine.
PB91-109207/REB 91-01 PC **A03**/MF **A01**

Assessment of Chemically-Induced Alterations in Brain Development Using Assays of Neuron- and Glia-Localized Proteins.
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NERVES
Influence of 50-Hz Electric and Magnetic Fields on Neurite Outgrowth in Pheochromocytoma Cells.
PB91-242461/REB 91-04 PC **A02**/MF **A01**

NERVOUS SYSTEM
Investigations of Amitraz Neurotoxicity in Rats. 3. Effects on Motor Activity and Inhibition of Monoamine Oxidase.
PB91-109470/REB 91-01 PC **A03**/MF **A01**

Neurotoxicology in the 1990s.
PB91-115832/REB 91-01 PC **A02**/MF **A01**

Rat and Human Visual-Evoked Potentials Recorded Under Comparable Conditions: A Preliminary Analysis to Address the Issue of Predicting Human Neurotoxic Effects from Rat Data.
PB91-116095/REB 91-01 PC **A02**/MF **A01**

Neurotoxicity of Subchronic Acetylcholinesterase (AChE) Inhibition in Rat Hippocampus.
PB91-116905/REB 91-01 PC **A03**/MF **A01**

Reflex Modification and the Detection of Toxicant-Induced Auditory Dysfunction.
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PB91-117077/REB 91-01 PC **A02**/MF **A01**

Comparative Sensitivity of Neurobehavioral Tests for Chemical Screening.
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Neurotoxic Effects of Colchicine.
PB91-149658/REB 91-01 PC **A03**/MF **A01**

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PB91-176990/REB 91-01 PC **A04**/MF **A01**

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PB91-177246/REB 91-01 PC **A03**/MF **A01**

Use of Glial Fibrillary Acidic Protein in First-Tier Assessments of Neurotoxicity.
PB91-191197/REB 91-01 PC **A03**/MF **A01**

Glutamate Neurotoxicity in Rat Auditory System: Cochlear Nuclear Complex.
PB91-191619/REB 91-01 PC **A02**/MF **A01**

Comparison of Screening Approaches.
PB91-199851/REB 91-01 PC **A03**/MF **A01**

Enhanced Expression of Glial Fibrillary Acidic Protein and the Cupric Silver Degeneration Reaction Can Be Used as Sensitive and Early Indicators of Neurotoxicity.
PB91-219147/REB 91-04 PC **A03**/MF **A01**

Animal Models of Cognitive Development in Neurotoxicology.
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Neurotoxicant 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) Alters Immune Function When Given in Combination with Diethyldithiocarbamate (DDC).
PB91-231092/REB 91-04 PC **A02**/MF **A01**

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Caveats in Hazard Assessment: Stress and Neurotoxicity.
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OPTICAL LENS FABRICATION LABORATORY

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Superfund Record of Decision (EPA Region 2): Woodland Township Route 72 Site, Burlington County, New Jersey (First Remedial Action), May 16, 1990.
PB91-921402/REB 91-01 PC **A06**/MF **A01**

Superfund Record of Decision (EPA Region 2): Radium Chemical Company Site, Woodside, Queens County, New York (First Remedial Action), Final Report, June 21, 1990.
PB91-921403/REB 91-01 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): W. M. Manufacturing Superfund Site, Danville, Pennsylvania (Second Remedial Action), June 29, 1990.
PB91-921404/REB 91-01 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): Croydon TCE Site, Bucks County, Pennsylvania (Second Remedial Action), Final Report, June 29, 1990.
PB91-921405/REB 91-01 PC **A07**/MF **A01**

Superfund Record of Decision (EPA Region 3): Walsh Landfill Site, Chester County, Pennsylvania (First Remedial Action), June 29, 1990.
PB91-921406/REB 91-01 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 3): Lord-Shope Landfill Site, Erie County, Pennsylvania (First Remedial Action), Final Report, June 29, 1990.
PB91-921407/REB 91-01 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 3): Army Creek Landfill Site, New Castle, Delaware (Second Remedial Action), Final Report, June 29, 1990.
PB91-921408/REB 91-01 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Whitewood Creek Site, Lawrence, Meade, and Butte Counties, South Dakota (First Remedial Action), Final Report, March 30, 1990.
PB91-921409/REB 91-01 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Onalaska Municipal Landfill Site, Lacrosse County, Wisconsin (First Remedial Action), Final Report, August 14, 1990.
PB91-921410/REB 91-01 PC **A06**/MF **A01**

Superfund Record of Decision (EPA Region 9): Watkins-Johnson (Stewart Division), Scotts Valley, California (First Remedial Action), Final Report, June 29, 1990.
PB91-921411/REB 91-01 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 10): Teledyne Wah Chang, Albany, OR. (First Remedial Action), December 1989.
PB91-921414/REB 91-01 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 1): Kearsarge Metallurgical Corporation, Conway, NH. (First Remedial Action), September 1990.
PB91-921416/REB 91-04 PC **A12**/MF **A03**

Superfund Record of Decision (EPA Region 2): Hooker-102nd Street Landfill, Niagara Falls, NY. (First Remedial Action), September 1990.
PB91-921417/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 1): Beacon Heights Landfill Site, Beacon Falls, CT. (First Remedial Action), September 1990. (Supplemental).
PB91-921418/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 1): Baird and McGuire/Alternate Water Supply, Holbrook, MA. (Third Remedial Action), September 1990.
PB91-921419/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 1): Old Springfield Landfill, Springfield, VT. (Second Remedial Action), September 1990.
PB91-921420/REB 91-04 PC **A17**/MF **A04**

Superfund Record of Decision (EPA Region 1): Stamina Mills Site, North Smithfield, RI. (First Remedial Action), September 1990.
PB91-921421/REB 91-04 PC **A10**/MF **A03**

Superfund Record of Decision (EPA Region 2): Sarney Farm, Amenia, Dutchess County, NY. (First Remedial Action), September 1990.
PB91-921422/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 2): Scientific Chemical Processing Site, Carlstadt, Bergen County, NJ. (First Remedial Action), September 1990.
PB91-921423/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 2): Sealand Restoration Site, Town of Lisbon, St. Lawrence County, NY. (First Remedial Action), September 1990.
PB91-921424/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): FAA Technical Center, Area 20A - Salvage Yard, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921425/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): Woodland Township Route 72 and Route 532 Dump Sites, Burlington County, Chatsworth, NJ. (First Remedial Action), May 1990.
PB91-921426/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): Hooker Chemical/Ruco Polymer Site, Hicksville, NY. (First Remedial Action), September 1990.
PB91-921427/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 2): Myers Property, Franklin Township, NJ. (First Remedial Action), September 1990.
PB91-921428/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): M and T DeLisa Landfill Site, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921429/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 2): Lone Pine Landfill, Freehold Township, Monmouth County, NJ. (Second Remedial Action), September 1990.
PB91-921430/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 2): Montclair/West Orange Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921431/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): Avtex Fibers Site, Front Royal, VA. (Second Remedial Action), September 1990.
PB91-921432/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): Fike/Artel Chemical Site, Nitro, WV. (Second Remedial Action), September 1990.
PB91-921433/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 3): Keystone Sanitation Landfill Site, Adams County, Union Township, PA. (First Remedial Action), September 1990.
PB91-921434/REB 91-04 PC **A07**/MF **A01**

Superfund Record of Decision (EPA Region 3): Croyden TCE Site, Bristol Township, Bucks County, PA. (Second Remedial Action), June 1990.
PB91-921435/REB 91-04 PC **A07**/MF **A01**

Superfund Record of Decision (EPA Region 2): Glen Ridge Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921436/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): Brown's Battery Breaking Site, Tilden Township, PA. (First Remedial Action), September 1990.
PB91-921437/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 3): Butz Landfill Superfund Site, Jackson Township, Monroe County, PA. (First Remedial Action), September 1990.
PB91-921438/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 3): Sand, Gravel and Stone Site, Elkton, MD. (Second Remedial Action), September 1990.
PB91-921439/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 3): Osborne Landfill Site, Pine Township, Mercer County, PA. (First Remedial Action), September 1990.
PB91-921440/REB 91-04 PC **A09**/MF **A01**

Superfund Record of Decision (EPA Region 3): East Mt. Zion Landfill, Springettsbury Township, York County, PA. (First Remedial Action), September 1990.
PB91-921441/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Harris/Palm Bay Facility, Palm Bay, Brevard County, FL. (First Remedial Action), June 1990.
PB91-921442/REB 91-04 PC **A06**/MF **A01**

Superfund Record of Decision (EPA Region 4): North Hollywood Dump, TN. (First Remedial Action), September 1990.
PB91-921443/REB 91-04 PC **A13**/MF **A02**

Superfund Record of Decision (EPA Region 4): Dubose Oil Products Site, Cantonment, Escambia County, FL. (First Remedial Action), March 1990.
PB91-921444/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): Kassouf-Kimerling Battery Site, Tampa, Hillsborough County, FL. (Second Remedial Action), March 1990.
PB91-921445/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): National Starch and Chemical Corporation Site, Salisbury, NC. (Second Remedial Action), September 1990.
PB91-921446/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 4): SCRDI Bluff Road Site, Columbia, Richland County, SC. (First Remedial Action), September 1990.
PB91-921447/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 4): Pickettville Road Landfill, Jacksonville, Duval County, FL. (First Remedial Action), September 1990.
PB91-921448/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Cabot Carbon/Koppers Site, Gainesville, Alachua County, FL. (First Remedial Action), September 1990.
PB91-921449/REB 91-04 PC **A07**/MF **A01**

Superfund Record of Decision (EPA Region 5): Tri-State Plating, Columbus, IN. (First Remedial Action), March 1990.
PB91-921450/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): Fisher-Calo Chem, Kingsbury, IN. (First Remedial Action), August 1990.
PB91-921451/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Wheeler Pit Site, La Prairie Township, WI. (First Remedial Action), September 1990.
PB91-921452/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Pristine, Inc., Reading, OH. (First Remedial Action), March 1990. (Amendment).
PB91-921453/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): K and L Landfill, Kalamazoo, MI. (First Remedial Action), September 1990.
PB91-921454/REB 91-04 PC **A02**/MF **A01**

Superfund Record of Decision (EPA Region 5): Ott/Story/Cordova Chemical Site, North Muskegon, MI. (Second Remedial Action), September 1990.
PB91-921455/REB 91-04 PC **A05**/MF **A02**

Superfund Record of Decision (EPA Region 5): Naval Industrial Reserve Ordnance Plant, Fridley, MN. (First Remedial Action), September 1990.
PB91-921456/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): National Presto Industries, Eau Claire, WI. (First Remedial Action), August 1990.
PB91-921457/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): St. Louis River/Interlake/Duluth Tar Site, Duluth, MN. (First Remedial Action), September 1990.
PB91-921458/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Clare Water Supply, Clare County, MI. (First Remedial Action), August 1990.
PB91-921459/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): University of Minnesota Rosemount Research Center, MN. (First Remedial Action), June 1990.
PB91-921460/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 5): Moss-American Kerr-McGee Oil Site, Milwaukee, WI. (First Remedial Action), September 1990.
PB91-921461/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 5): Springfield Township Dump Site, Oakland County, MI. (First Remedial Action), September 1990.
PB91-921462/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 5): Metamora Landfill, Metamora, Lapeer County, MI. (Second Remedial Action), September 1990.
PB91-921463/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Hunts Disposal Landfill Site, Town of Caledonia, WI. (First Remedial Action), September 1990.
PB91-921464/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Union Scrap Iron Metal, Hennepin County, Minneapolis, MN. (First Remedial Action), March 1990.
PB91-921465/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): Bofors-Nobel Site, Muskegon, MI. (First Remedial Action), September 1990.
PB91-921466/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Jacksonville Municipal Landfill Superfund Site, AR. (First Remedial Action), September 1990.
PB91-921467/REB 91-04 PC **A09**/MF **A02**

Superfund Record of Decision (EPA Region 6): Texarkana Wood Preserving Company, Texarkana, Bowie County, TX. (First Remedial Action), September 1990.
PB91-921468/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Tenth Street Dump/Junkyard, Oklahoma City, OK. (First Remedial Action), September 1990.
PB91-921469/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Tinker AFB (Soldier Creek/Bldg. 3001), OK. (First Remedial Action), August 1990.
PB91-921470/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 7): Northwestern States Portland Cement Company Site, Mason City, IA. (First Remedial Action), June 1990.
PB91-921471/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination (East Industrial Park), NE (First Remedial Action), September 1990.
PB91-921472/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination FAR-MAR-CO Subsite, Hastings Irrigation Pipe Company TCA Soils Operable Unit, Hastings, NE. (Second Remedial Action), September 1990.
PB91-921473/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 7): Lindsay Manufacturing Company, Lindsay, NE. (First Remedial Action), September 1990.
PB91-921474/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 7): Midwest Manufacturing/North Farm Site, Midwest Operable Unit, Kellogg, IA. (First Remedial Action), September 1990.
PB91-921475/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 7): Missouri Electric Works Site, Cape Girardeau, MO. (First Remedial Action), September 1990.
PB91-921476/REB 91-04 PC **A05**/MF **A02**

Superfund Record of Decision (EPA Region 7): Waverly Ground Water Contamination Site, Waverly, NE. (First Remedial Action), September 1990.
PB91-921477/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 7): Fairfield Coal Gasification Site, Fairfield, IA. (First Remedial Action), September 1990.
PB91-921478/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Sand Creek Industrial Site, Commerce City, CO. (Second Remedial Action), September 1990.
PB91-921479/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Ogden Defense Depot (Operable Unit 2), Weber County, Ogden, UT. (First Remedial Action), September 1990.
PB91-921480/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Mystery Bridge at Highway 20, Natrona County, WY. (First Remedial Action), September 1990.
PB91-921481/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 8): Monticello Mill Tailings Site, San Juan County, UT. (First Remedial Action), August 1990.
PB91-921482/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Martin Marietta Astronautics Group Site, Waterton, CO. (First Remedial Action), September 1990.
PB91-921483/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 16), CO. (Second Remedial Action), February 1990.
PB91-921484/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 18), CO. (Third Remedial Action), February 1990.
PB91-921485/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 20), CO. (Fifth Remedial Action), March 1990.
PB91-921486/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Flats Plant (DOE), Northern Jefferson County, CO. (First Remedial Action), January 1990.
PB91-921487/REB 91-04 PC **A19**/MF **A04**

Superfund Record of Decision (EPA Region 8): Sharon Steel (Midvale Tailings), Midvale, UT. (First Remedial Action), September 1990.
PB91-921488/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 9): J. H. Baxter Superfund Site, Weed, CA. (First Remedial Action), September 1990.
PB91-921489/REB 91-04 PC **A10**/MF **A03**

Superfund Record of Decision (EPA Region 9): Stringfellow Hazardous Waste Site, Riverside County, CA. (Fourth Remedial Action), September 1990.
PB91-921490/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 9): Louisiana-Pacific Corporation, Oroville, CA. (First Remedial Action), September 1990.
PB91-921491/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 9): Applied Materials, Inc., Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921492/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 9): Operating Industries, Inc., Monterey Park, CA. (Third Remedial Action), September 1990 (Amendment).
PB91-921493/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 10): FMC Pesticide Formulation Facility, Yakima, WA. (First Remedial Action), September 1990.
PB91-921494/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): Mannheim Avenue Dump Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921495/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): Higgins Farm, Franklin Township, Somerset County, NJ. (First Remedial Action), September 1990.
PB91-921496/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 2): Pomona Oaks Well Contamination Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921497/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 2): Imperial Oil/Champion Chemicals, Marlboro Township, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921498/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): Vestal Water Supply Well No. 1-1, Broome County, Vestal, NY. (Second Remedial Action), September 1990.
PB91-921499/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 4): Schuylkill Metal, Hillsborough County, Plant City, FL. (First Remedial Action), September 1990.
PB91-921501/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 3): Cryo-Chem Site, Earl Township, Berks County, PA. (Second Remedial Action), September 1990.
PB91-921502/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): King of Prussia Technical Corporation Site, Winslow Township, Camden County, NJ. (First Remedial Action), September 1990.
PB91-921503/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 3): Raymark Site, Hatboro Borough, Montgomery County, PA. (First Remedial Action), September 1990.
PB91-921504/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 3): Dover Air Force Base, DE. (First Remedial Action), September 1990.
PB91-921505/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): Hipps Road Landfill Site, Duval County, Jacksonville, FL. (First Remedial Action), (Amendment), September 1990.
PB91-921506/REB 91-04 PC **A11**/MF **A03**

Superfund Record of Decision (EPA Region 4): 62nd Street Dump, Hillsborough County, Tampa, FL. (First Remedial Action), June 1990.
PB91-921507/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Zellwood Groundwater Contamination Site, (Operable Unit 1), Orange County, Zellwood, FL. (First Remedial Action), (Amendment), March 1990.
PB91-921508/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Sangamo/Crab Orchard National Wildlife Refuge (USDOI), Carterville, IL. (First Remedial Action), August 1990.
PB91-921509/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 6): Crystal Chemical Site, Houston, TX. (First Remedial Action), September 1990.
PB91-921510/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 19), CO. (Fourth Remedial Action), February 1990.
PB91-921511/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 17), CO. (Eighth Remedial Action), February 1990.
PB91-921512/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Vertac, Inc., Jacksonville, AR. (First Remedial Action), September 1990.
PB91-921513/REB 91-04 PC **A09**/MF **A02**

Superfund Record of Decision (EPA Region 7): White Farm Equipment Company Dump Site, Floyd County, Charles City, IA. (First Remedial Action), September 1990.
PB91-921514/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): NL Industries/Taracorp Lead Smelting, Granite City, IL. (First Remedial Action), March 1990.
PB91-921515/REB 91-04 PC **A09**/MF **A03**

Superfund Record of Decision (EPA Region 3): Tyson Dump Number 1, Upper Merion Township, Montgomery County, PA. (Third Remedial Action), September 1990.
PB91-921516/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Oconomowoc Electroplating Company Site, Ashippun, WI. (First Remedial Action), September 1990.
PB91-921517/REB 91-04 PC **A05**/MF **A02**

Superfund Record of Decision (EPA Region 5): Algoma Municipal Landfill, Algoma, WI. (First Remedial Action), September 1990.
PB91-921518/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Reilly Tar and Chemical Corporation Site, St. Peter Aquifer, St. Louis Park, MN. (Third Remedial Action), September 1990.
PB91-921519/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 6): Pagano Salvage Site, Los Lunas, NM. (First Remedial Action), September 1990.
PB91-921520/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 6): Arkwood, Inc., Omaha, AR. (First Remedial Action), September 1990.
PB91-921521/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 9): Coalinga Asbestos Mine, Fresno County, CA. (Second Remedial Action), September 1990.
PB91-921523/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Master Disposal Service Landfill, Brookfield, WI. (First Remedial Action), September 1990.
PB91-921524/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): Munisport Landfill Site, Dade County, North Miami, FL. (First Remedial Action), July 1990.
PB91-921525/REB 91-04 PC **A09**/MF **A02**

Superfund Record of Decision (EPA Region 2): Claremont Polychemical, Nassau County, Old Bethpage, NY. (Second Remedial Action), September 1990.
PB91-921526/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 2): Metaltec/Aerosystems, Franklin Borough, Sussex County, NJ. (Second Remedial Action), September 1990.
PB91-921527/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Silver Bow Creek/Butte Area NPL Site, Warm Springs Ponds

Operable Unit, Upper Clark Fork River Basin, MT. (First Remedial Action), September 1990.
PB91-921528/REB 91-04 PC **A20**/MF **A04**

Superfund Record of Decision (EPA Region 2): Chemical Leaman Tank Lines Site, Logan Township, Gloucester County, NJ. (First Remedial Action), September 1990.
PB91-921529/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): City Industries, Winter Park, FL. (First Remedial Action), March 1990.
PB91-921530/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Bypass 601 Groundwater Contamination Site (Martin Scrap Recycling Facility), Concord, NC. (First Remedial Action), August 1990.
PB91-921531/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 7): Wheeling Disposal Service Company Landfill, Amazonia, MO. (First Remedial Action), September 1990.
PB91-921532/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 2): Mattiace Petrochemical Company, Broome County, Glen Cove, NY. (First Remedial Action), September 1990.
PB91-921533/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 9): Intel Santa Clara III Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921534/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 9): Intersil/Siemens Superfund Site, Cupertino, CA. (First Remedial Action), September 1990.
PB91-921535/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 4): Howe Valley Landfill, Howe Valley, KY. (First Remedial Action), September 1990.
PB91-921539/REB 91-04 PC **A11**/MF **A03**

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PB91-921540/REB 91-04 PC **A07**/MF **A02**

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PB91-921541/REB 91-04 PC **A03**/MF **A01**

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PB91-921542/REB 91-04 PC **A04**/MF **A01**

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PB91-921543/REB 91-04 PC **A05**/MF **A01**

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PB91-921544/REB 91-04 PC **A07**/MF **A02**

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PB91-921545/REB 91-04 PC **A03**/MF **A01**

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SEEDS

Anatomy of the Seed and Seedling of 'Spartina alterniflora' Lois. (Poaceae).
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PB91-921321/REB 91-01 PC **A01**/MF **A01**

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PB91-921339/REB 91-04 PC **A03**/MF **A01**

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PB91-921413/REB 91-01 PC **A05**/MF **A01**

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PB91-921414/REB 91-01 PC **A04**/MF **A01**

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PB91-921415/REB 91-01 PC **A15**/MF **A02**

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PB91-921416/REB 91-04 PC **A12**/MF **A03**

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PB91-921420/REB 91-04 PC **A17**/MF **A04**

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PB91-921421/REB 91-04 PC **A10**/MF **A03**

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PB91-921422/REB 91-04 PC **A07**/MF **A02**

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PB91-921423/REB 91-04 PC **A05**/MF **A01**

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PB91-921424/REB 91-04 PC **A04**/MF **A01**

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PB91-921425/REB 91-04 PC **A04**/MF **A01**

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PB91-921426/REB 91-04 PC **A06**/MF **A02**

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PB91-921427/REB 91-04 PC **A07**/MF **A02**

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PB91-921428/REB 91-04 PC **A06**/MF **A02**

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PB91-921429/REB 91-04 PC **A03**/MF **A01**

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PB91-921430/REB 91-04 PC **A05**/MF **A01**

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PB91-921431/REB 91-04 PC **A04**/MF **A01**

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PB91-921432/REB 91-04 PC **A04**/MF **A01**

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PB91-921433/REB 91-04 PC **A03**/MF **A01**

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PB91-921434/REB 91-04 PC **A07**/MF **A01**

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PB91-921435/REB 91-04 PC **A07**/MF **A01**

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PB91-921436/REB 91-04 PC **A04**/MF **A01**

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PB91-921437/REB 91-04 PC **A05**/MF **A01**

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PB91-921438/REB 91-04 PC **A03**/MF **A01**

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PB91-921439/REB 91-04 PC **A05**/MF **A01**

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PB91-921440/REB 91-04 PC **A09**/MF **A01**

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PB91-921441/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Harris/Palm Bay Facility, Palm Bay, Brevard County, FL. (First Remedial Action), June 1990.
PB91-921442/REB 91-04 PC **A06**/MF **A01**

Superfund Record of Decision (EPA Region 4): North Hollywood Dump, TN. (First Remedial Action), September 1990.
PB91-921443/REB 91-04 PC **A13**/MF **A02**

Superfund Record of Decision (EPA Region 4): Dubose Oil Products Site, Cantonment, Escambia County, FL. (First Remedial Action), March 1990.
PB91-921444/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): Kassouf-Kimerling Battery Site, Tampa, Hillsborough County, FL. (Second Remedial Action), March 1990.
PB91-921445/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): National Starch and Chemical Corporation Site, Salisbury, NC. (Second Remedial Action), September 1990.
PB91-921446/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 4): SCRDI Bluff Road Site, Columbia, Richland County, SC. (First Remedial Action), September 1990.
PB91-921447/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 4): Pickettville Road Landfill, Jacksonville, Duval County, FL. (First Remedial Action), September 1990.
PB91-921448/REB 91-04 PC **A05**/MF **A01**

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PB91-921449/REB 91-04 PC **A07**/MF **A01**

Superfund Record of Decision (EPA Region 5): Tri-State Plating, Columbus, IN. (First Remedial Action), March 1990.
PB91-921450/REB 91-04 PC **A03**/MF **A01**

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PB91-921451/REB 91-04 PC **A05**/MF **A01**

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PB91-921452/REB 91-04 PC **A05**/MF **A01**

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PB91-921453/REB 91-04 PC **A03**/MF **A01**

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PB91-921454/REB 91-04 PC **A02**/MF **A01**

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PB91-921455/REB 91-04 PC **A05**/MF **A02**

Superfund Record of Decision (EPA Region 5): Naval Industrial Reserve Ordnance Plant, Fridley, MN. (First Remedial Action), September 1990.
PB91-921456/REB 91-04 PC **A04**/MF **A01**

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PB91-921457/REB 91-04 PC **A05**/MF **A01**

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PB91-921458/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Clare Water Supply, Clare County, MI. (First Remedial Action), August 1990.
PB91-921459/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): University of Minnesota Rosemount Research Center, MN. (First Remedial Action), June 1990.
PB91-921460/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 5): Moss-American Kerr-McGee Oil Site, Milwaukee, WI. (First Remedial Action), September 1990.
PB91-921461/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 5): Springfield Township Dump Site, Oakland County, MI. (First Remedial Action), September 1990.
PB91-921462/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 5): Metamora Landfill, Metamora, Lapeer County, MI. (Second Remedial Action), September 1990.
PB91-921463/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Hunts Disposal Landfill Site, Town of Caledonia, WI. (First Remedial Action), September 1990.
PB91-921464/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Union Scrap Iron Metal, Hennepin County, Minneapolis, MN. (First Remedial Action), March 1990.
PB91-921465/REB 91-04 PC **A03**/MF **A01**

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PB91-921466/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Jacksonville Municipal Landfill Superfund Site, AR. (First Remedial Action), September 1990.
PB91-921467/REB 91-04 PC **A09**/MF **A02**

Superfund Record of Decision (EPA Region 6): Texarkana Wood Preserving Company, Texarkana, Bowie County, TX. (First Remedial Action), September 1990.
PB91-921468/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Tenth Street Dump/Junkyard, Oklahoma City, OK. (First Remedial Action), September 1990.
PB91-921469/REB 91-04 PC **A05**/MF **A01**

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PB91-921470/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 7): Northwestern States Portland Cement Company Site, Mason City, IA. (First Remedial Action), June 1990.
PB91-921471/REB 91-04 PC **A03**/MF **A01**

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PB91-921472/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination FAR-MAR-CO Subsite, Hastings Irrigation Pipe Company TCA Soils Operable Unit, Hastings, NE. (Second Remedial Action), September 1990.
PB91-921473/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 7): Lindsay Manufacturing Company, Lindsay, NE. (First Remedial Action), September 1990.
PB91-921474/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 7): Midwest Manufacturing/North Farm Site, Midwest Operable Unit, Kellogg, IA. (First Remedial Action), September 1990.
PB91-921475/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 7): Missouri Electric Works Site, Cape Girardeau, MO. (First Remedial Action), September 1990.
PB91-921476/REB 91-04 PC **A05**/MF **A02**

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PB91-921477/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 7): Fairfield Coal Gasification Site, Fairfield, IA. (First Remedial Action), September 1990.
PB91-921478/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Sand Creek Industrial Site, Commerce City, CO. (Second Remedial Action), September 1990.
PB91-921479/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Ogden Defense Depot (Operable Unit 2), Weber County, Ogden, UT. (First Remedial Action), September 1990.
PB91-921480/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Mystery Bridge at Highway 20, Natrona County, WY. (First Remedial Action), September 1990.
PB91-921481/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 8): Monticello Mill Tailings Site, San Juan County, UT. (First Remedial Action), August 1990.
PB91-921482/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Martin Marietta Astronautics Group Site, Waterton, CO. (First Remedial Action), September 1990.
PB91-921483/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 16), CO. (Second Remedial Action), February 1990.
PB91-921484/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 18), CO. (Third Remedial Action), February 1990.
PB91-921485/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 20), CO. (Fifth Remedial Action), March 1990.
PB91-921486/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Flats Plant (DOE), Northern Jefferson County, CO. (First Remedial Action), January 1990.
PB91-921487/REB 91-04 PC **A19**/MF **A04**

Superfund Record of Decision (EPA Region 8): Sharon Steel (Midvale Tailings), Midvale, UT. (First Remedial Action), September 1990.
PB91-921488/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 9): J. H. Baxter Superfund Site, Weed, CA. (First Remedial Action), September 1990.
PB91-921489/REB 91-04 PC **A10**/MF **A03**

Superfund Record of Decision (EPA Region 9): Stringfellow Hazardous Waste Site, Riverside County, CA. (Fourth Remedial Action), September 1990.
PB91-921490/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 9): Louisiana-Pacific Corporation, Oroville, CA. (First Remedial Action), September 1990.
PB91-921491/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 9): Applied Materials, Inc., Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921492/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 9): Operating Industries, Inc., Monterey Park, CA. (Third Remedial Action), September 1990 (Amendment).
PB91-921493/REB 91-04 PC **A03**/MF **A01**

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PB91-921494/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): Mannheim Avenue Dump Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921495/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): Higgins Farm, Franklin Township, Somerset County, NJ. (First Remedial Action), September 1990.
PB91-921496/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 2): Pomona Oaks Well Contamination Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921497/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 2): Imperial Oil/Champion Chemicals, Marlboro Township, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921498/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): Vestal Water Supply Well No. 1-1, Broome County, Vestal, NY. (Second Remedial Action), September 1990.
PB91-921499/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 4): Schuylkill Metal, Hillsborough County, Plant City, FL. (First Remedial Action), September 1990.
PB91-921501/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 3): Cryo-Chem Site, Earl Township, Berks County, PA. (Second Remedial Action), September 1990.
PB91-921502/REB 91-04 PC **A06**/MF **A02**

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PB91-921503/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 3): Raymark Site, Hatboro Borough, Montgomery County, PA. (First Remedial Action), September 1990.
PB91-921504/REB 91-04 PC **A08**/MF **A02**

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PB91-921505/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): Hipps Road Landfill Site, Duval County, Jacksonville, FL. (First Remedial Action), (Amendment), September 1990.
PB91-921506/REB 91-04 PC **A11**/MF **A03**

Superfund Record of Decision (EPA Region 4): 62nd Street Dump, Hillsborough County, Tampa, FL. (First Remedial Action), June 1990.
PB91-921507/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Zellwood Groundwater Contamination Site, (Operable Unit 1), Orange County, Zellwood, FL. (First Remedial Action), (Amendment), March 1990.
PB91-921508/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Sangamo/Crab Orchard National Wildlife Refuge (USDOI), Carterville, IL. (First Remedial Action), August 1990.
PB91-921509/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 6): Crystal Chemical Site, Houston, TX. (First Remedial Action), September 1990.
PB91-921510/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 19), CO. (Fourth Remedial Action), February 1990.
PB91-921511/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 17), CO. (Eighth Remedial Action), February 1990.
PB91-921512/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Vertac, Inc., Jacksonville, AR. (First Remedial Action), September 1990.
PB91-921513/REB 91-04 PC **A09**/MF **A02**

Superfund Record of Decision (EPA Region 7): White Farm Equipment Company Dump Site, Floyd County, Charles City, IA. (First Remedial Action), September 1990.
PB91-921514/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): NL Industries/Taracorp Lead Smelting, Granite City, IL. (First Remedial Action), March 1990.
PB91-921515/REB 91-04 PC **A09**/MF **A03**

Superfund Record of Decision (EPA Region 3): Tyson Dump Number 1, Upper Merion Township, Montgomery County, PA. (Third Remedial Action), September 1990.
PB91-921516/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Oconomowoc Electroplating Company Site, Ashippun, WI. (First Remedial Action), September 1990.
PB91-921517/REB 91-04 PC **A05**/MF **A02**

Superfund Record of Decision (EPA Region 5): Algoma Municipal Landfill, Algoma, WI. (First Remedial Action), September 1990.
PB91-921518/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Reilly Tar and Chemical Corporation Site, St. Peter Aquifer, St. Louis Park, MN. (Third Remedial Action), September 1990.
PB91-921519/REB 91-04 PC **A04**/MF **A01**

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PB91-921520/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 6): Arkwood, Inc., Omaha, AR. (First Remedial Action), September 1990.
PB91-921521/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 9): Coalinga Asbestos Mine, Fresno County, CA. (Second Remedial Action), September 1990.
PB91-921523/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Master Disposal Service Landfill, Brookfield, WI. (First Remedial Action), September 1990.
PB91-921524/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): Munisport Landfill Site, Dade County, North Miami, FL. (First Remedial Action), July 1990.
PB91-921525/REB 91-04 PC **A09**/MF **A02**

Superfund Record of Decision (EPA Region 2): Claremont Polychemical, Nassau County, Old Bethpage, NY. (Second Remedial Action), September 1990.
PB91-921526/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 2): Metaltec/Aerosystems, Franklin Borough, Sussex County, NJ. (Second Remedial Action), September 1990.
PB91-921527/REB 91-04 PC **A05**/MF **A01**

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PB91-921528/REB 91-04 PC **A20**/MF **A04**

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PB91-921529/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): City Industries, Winter Park, FL. (First Remedial Action), March 1990.
PB91-921530/REB 91-04 PC **A05**/MF **A01**

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PB91-921531/REB 91-04 PC **A04**/MF **A01**

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PB91-921532/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 2): Mattiace Petrochemical Company, Broome County, Glen Cove, NY. (First Remedial Action), September 1990.
PB91-921533/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 9): Intel Santa Clara III Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921534/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 9): Intersil/Siemens Superfund Site, Cupertino, CA. (First Remedial Action), September 1990.
PB91-921535/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 4): Howe Valley Landfill, Howe Valley, KY. (First Remedial Action), September 1990.
PB91-921539/REB 91-04 PC **A11**/MF **A03**

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PB91-921540/REB 91-04 PC **A07**/MF **A02**

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PB91-921541/REB 91-04 PC **A03**/MF **A01**

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PB91-921542/REB 91-04 PC **A04**/MF **A01**

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PB91-921547/REB 91-04 PC **A05**/MF **A01**

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PB91-921548/REB 91-04 PC **A08**/MF **A02**

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PB91-921553/REB 91-04 PC **A04**/MF **A01**

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PB91-921554/REB 91-04 PC **A05**/MF **A01**

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PB91-921557/REB 91-04 PC **A12**/MF **A03**

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PB91-921561/REB 91-04 PC **A11**/MF **A03**

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PB91-921562/REB 91-04 PC **A05**/MF **A01**

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Guide to Discharging CERCLA Aqueous Wastes to Publicly Owned Treatment Works (POTWs).
PB91-921364/REB 91-04 PC **A01**/MF **A01**

Guide: Methods for Evaluating the Attainment of Cleanup Standards for Soils and Solid Media.
PB91-921365/REB 91-04 PC **A02**/MF **A01**

Guide to Obtaining No Migration Variances for CERCLA Remedial Actions.
PB91-921367/REB 91-04 PC **A01**/MF **A01**

Structure and Components of Five-Year Reviews.
PB91-921368/REB 91-04 PC **A01**/MF **A01**

Structure and Components of Five-Year Reviews.
PB91-921369/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): Rose Township, Oakland County, Michigan. (First Remedial Action), September 18, 1989.
PB91-921412/REB 91-01 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 1): Tinkham's Garage Site, Londonderry, New Hampshire. (First Remedial Action), March 10, 1989.
PB91-921413/REB 91-01 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 1): Kearsarge Metallurgical Corporation, Conway, NH. (First Remedial Action), September 1990.
PB91-921416/REB 91-04 PC **A12**/MF **A03**

Superfund Record of Decision (EPA Region 2): Hooker-102nd Street Landfill, Niagara Falls, NY. (First Remedial Action), September 1990.
PB91-921417/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 1): Beacon Heights Landfill Site, Beacon Falls, CT. (First Remedial Action), September 1990. (Supplemental).
PB91-921418/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 1): Old Springfield Landfill, Springfield, VT. (Second Remedial Action), September 1990.
PB91-921420/REB 91-04 PC **A17**/MF **A04**

Superfund Record of Decision (EPA Region 1): Stamina Mills Site, North Smithfield, RI. (First Remedial Action), September 1990.
PB91-921421/REB 91-04 PC **A10**/MF **A03**

Superfund Record of Decision (EPA Region 2): Sarney Farm, Amenia, Dutchess County, NY. (First Remedial Action), September 1990.
PB91-921422/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 2): Scientific Chemical Processing Site, Carlstadt, Bergen County, NJ. (First Remedial Action), September 1990.
PB91-921423/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 2): Sealand Restoration Site, Town of Lisbon, St. Lawrence County, NY. (First Remedial Action), September 1990.
PB91-921424/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): FAA Technical Center, Area 20A - Salvage Yard, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921425/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): Woodland Township Route 72 and Route 532 Dump Sites, Burlington County, Chatsworth, NJ. (First Remedial Action), May 1990.
PB91-921426/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): Hooker Chemical/Ruco Polymer Site, Hicksville, NY. (First Remedial Action), September 1990.
PB91-921427/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 2): Myers Property, Franklin Township, NJ. (First Remedial Action), September 1990.
PB91-921428/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): M and T DeLisa Landfill Site, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921429/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 2): Lone Pine Landfill, Freehold Township, Monmouth County, NJ. (Second Remedial Action), September 1990.
PB91-921430/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 2): Montclair/West Orange Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921431/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): Avtex Fibers Site, Front Royal, VA. (Second Remedial Action), September 1990.
PB91-921432/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): Fike/Artel Chemical Site, Nitro, WV. (Second Remedial Action), September 1990.
PB91-921433/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 3): Keystone Sanitation Landfill Site, Adams County, Union Township, PA. (First Remedial Action), September 1990.
PB91-921434/REB 91-04 PC **A07**/MF **A01**

Superfund Record of Decision (EPA Region 3): Croyden TCE Site, Bristol Township, Bucks County, PA. (Second Remedial Action), June 1990.
PB91-921435/REB 91-04 PC **A07**/MF **A01**

Superfund Record of Decision (EPA Region 2): Glen Ridge Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921436/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 3): Brown's Battery Breaking Site, Tilden Township, PA. (First Remedial Action), September 1990.
PB91-921437/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 3): Butz Landfill Superfund Site, Jackson Township, Monroe County, PA. (First Remedial Action), September 1990.
PB91-921438/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 3): Sand, Gravel and Stone Site, Elkton, MD. (Second Remedial Action), September 1990.
PB91-921439/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 3): Osborne Landfill Site, Pine Township, Mercer County, PA. (First Remedial Action), September 1990.
PB91-921440/REB 91-04 PC **A09**/MF **A01**

Superfund Record of Decision (EPA Region 3): East Mt. Zion Landfill, Springettsbury Township, York County, PA. (First Remedial Action), September 1990.
PB91-921441/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Harris/Palm Bay Facility, Palm Bay, Brevard County, FL. (First Remedial Action), June 1990.
PB91-921442/REB 91-04 PC **A06**/MF **A01**

Superfund Record of Decision (EPA Region 4): North Hollywood Dump, TN. (First Remedial Action), September 1990.
PB91-921443/REB 91-04 PC **A13**/MF **A02**

Superfund Record of Decision (EPA Region 4): Dubose Oil Products Site, Cantonment, Escambia County, FL. (First Remedial Action), March 1990.
PB91-921444/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): Kassouf-Kimerling Battery Site, Tampa, Hillsborough County, FL. (Second Remedial Action), March 1990.
PB91-921445/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): National Starch and Chemical Corporation Site, Salisbury, NC. (Second Remedial Action), September 1990.
PB91-921446/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 4): SCRDI Bluff Road Site, Columbia, Richland County, SC. (First Remedial Action), September 1990.
PB91-921447/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 4): Pickettville Road Landfill, Jacksonville, Duval County, FL. (First Remedial Action), September 1990.
PB91-921448/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Cabot Carbon/Koppers Site, Gainesville, Alachua County, FL. (First Remedial Action), September 1990.
PB91-921449/REB 91-04 PC **A07**/MF **A01**

Superfund Record of Decision (EPA Region 5): Tri-State Plating, Columbus, IN. (First Remedial Action), March 1990.
PB91-921450/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): Fisher-Calo Chem, Kingsbury, IN. (First Remedial Action), August 1990.
PB91-921451/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Wheeler Pit Site, La Prairie Township, WI. (First Remedial Action), September 1990.
PB91-921452/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Pristine, Inc., Reading, OH. (First Remedial Action), March 1990. (Amendment).
PB91-921453/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): K and L Landfill, Kalamazoo, MI. (First Remedial Action), September 1990.
PB91-921454/REB 91-04 PC **A02**/MF **A01**

Superfund Record of Decision (EPA Region 5): Ott/Story/Cordova Chemical Site, North Muskegon, MI. (Second Remedial Action), September 1990.
PB91-921455/REB 91-04 PC **A05**/MF **A02**

Superfund Record of Decision (EPA Region 5): Naval Industrial Reserve Ordnance Plant, Fridley, MN. (First Remedial Action), September 1990.
PB91-921456/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): National Presto Industries, Eau Claire, WI. (First Remedial Action), August 1990.
PB91-921457/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): St. Louis River/Interlake/Duluth Tar Site, Duluth, MN. (First Remedial Action), September 1990.
PB91-921458/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Clare Water Supply, Clare County, MI. (First Remedial Action), August 1990.
PB91-921459/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): University of Minnesota Rosemount Research Center, MN. (First Remedial Action), June 1990.
PB91-921460/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 5): Moss-American Kerr-McGee Oil Site, Milwaukee, WI. (First Remedial Action), September 1990.
PB91-921461/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 5): Springfield Township Dump Site, Oakland County, MI. (First Remedial Action), September 1990.
PB91-921462/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 5): Metamora Landfill, Metamora, Lapeer County, MI. (Second Remedial Action), September 1990.
PB91-921463/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Hunts Disposal Landfill Site, Town of Caledonia, WI. (First Remedial Action), September 1990.
PB91-921464/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 5): Union Scrap Iron Metal, Hennepin County, Minneapolis, MN. (First Remedial Action), March 1990.
PB91-921465/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 5): Bofors-Nobel Site, Muskegon, MI. (First Remedial Action), September 1990.
PB91-921466/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Jacksonville Municipal Landfill Superfund Site, AR. (First Remedial Action), September 1990.
PB91-921467/REB 91-04 PC **A09**/MF **A02**

Superfund Record of Decision (EPA Region 6): Texarkana Wood Preserving Company, Texarkana, Bowie County, TX. (First Remedial Action), September 1990.
PB91-921468/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Tenth Street Dump/Junkyard, Oklahoma City, OK. (First Remedial Action), September 1990.
PB91-921469/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Tinker AFB (Soldier Creek/Bldg. 3001), OK. (First Remedial Action), August 1990.
PB91-921470/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 7): Northwestern States Portland Cement Company Site, Mason City, IA. (First Remedial Action), June 1990.
PB91-921471/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination (East Industrial Park), NE (First Remedial Action), September 1990.
PB91-921472/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination FAR-MAR-CO Subsite, Hastings Irrigation Pipe Company TCA Soils Operable Unit, Hastings, NE. (Second Remedial Action), September 1990.
PB91-921473/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 7): Lindsay Manufacturing Company, Lindsay, NE. (First Remedial Action), September 1990.
PB91-921474/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 7): Midwest Manufacturing/North Farm Site, Midwest Operable Unit, Kellogg, IA. (First Remedial Action), September 1990.
PB91-921475/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 7): Fairfield Coal Gasification Site, Fairfield, IA. (First Remedial Action), September 1990.
PB91-921478/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Sand Creek Industrial Site, Commerce City, CO. (Second Remedial Action), September 1990.
PB91-921479/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Ogden Defense Depot (Operable Unit 2), Weber County, Ogden, UT. (First Remedial Action), September 1990.
PB91-921480/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Mystery Bridge at Highway 20, Natrona County, WY. (First Remedial Action), September 1990.
PB91-921481/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 8): Monticello Mill Tailings Site, San Juan County, UT. (First Remedial Action), August 1990.
PB91-921482/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Martin Marietta Astronautics Group Site, Waterton, CO. (First Remedial Action), September 1990.
PB91-921483/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 16), CO. (Second Remedial Action), February 1990.
PB91-921484/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 18), CO. (Third Remedial Action), February 1990.
PB91-921485/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 20), CO. (Fifth Remedial Action), March 1990.
PB91-921486/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 8): Rocky Flats Plant (DOE), Northern Jefferson County, CO. (First Remedial Action), January 1990.
PB91-921487/REB 91-04 PC **A19**/MF **A04**

Superfund Record of Decision (EPA Region 8): Sharon Steel (Midvale Tailings), Midvale, UT. (First Remedial Action), September 1990.
PB91-921488/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 9): J. H. Baxter Superfund Site, Weed, CA. (First Remedial Action), September 1990.
PB91-921489/REB 91-04 PC **A10**/MF **A03**

Superfund Record of Decision (EPA Region 9): Stringfellow Hazardous Waste Site, Riverside County, CA. (Fourth Remedial Action), September 1990.
PB91-921490/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 9): Louisiana-Pacific Corporation, Oroville, CA. (First Remedial Action), September 1990.
PB91-921491/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 9): Applied Materials, Inc., Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921492/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 9): Operating Industries, Inc., Monterey Park, CA. (Third Remedial Action), September 1990 (Amendment).
PB91-921493/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 10): FMC Pesticide Formulation Facility, Yakima, WA. (First Remedial Action), September 1990.
PB91-921494/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): Mannheim Avenue Dump Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921495/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): Higgins Farm, Franklin Township, Somerset County, NJ. (First Remedial Action), September 1990.
PB91-921496/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 2): Imperial Oil/Champion Chemicals, Marlboro Township, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921498/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 2): Vestal Water Supply Well No. 1-1, Broome County, Vestal, NY. (Second Remedial Action), September 1990.
PB91-921499/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 4): Schuylkill Metal, Hillsborough County, Plant City, FL. (First Remedial Action), September 1990.
PB91-921501/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 3): Cryo-Chem Site, Earl Township, Berks County, PA. (Second Remedial Action), September 1990.
PB91-921502/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): King of Prussia Technical Corporation Site, Winslow Township, Camden County, NJ. (First Remedial Action), September 1990.
PB91-921503/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 3): Dover Air Force Base, DE. (First Remedial Action), September 1990.
PB91-921505/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): Hipps Road Landfill Site, Duval County, Jacksonville, FL. (First Remedial Action), (Amendment), September 1990.
PB91-921506/REB 91-04 PC **A11**/MF **A03**

Superfund Record of Decision (EPA Region 4): 62nd Street Dump, Hillsborough County, Tampa, FL. (First Remedial Action), June 1990.
PB91-921507/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Zellwood Groundwater Contamination Site, (Operable Unit 1), Orange County, Zellwood, FL. (First Remedial Action), (Amendment), March 1990.
PB91-921508/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Sangamo/Crab Orchard National Wildlife Refuge (USDOI), Carterville, IL. (First Remedial Action), August 1990.
PB91-921509/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 6): Crystal Chemical Site, Houston, TX. (First Remedial Action), September 1990.
PB91-921510/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 19), CO. (Fourth Remedial Action), February 1990.
PB91-921511/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 17), CO. (Eighth Remedial Action), February 1990.
PB91-921512/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 6): Vertac, Inc., Jacksonville, AR. (First Remedial Action), September 1990.
PB91-921513/REB 91-04 PC **A09**/MF **A02**

Superfund Record of Decision (EPA Region 3): Tyson Dump Number 1, Upper Merion Township, Montgomery County, PA. (Third Remedial Action), September 1990.
PB91-921516/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Oconomowoc Electroplating Company Site, Ashippun, WI. (First Remedial Action), September 1990.
PB91-921517/REB 91-04 PC **A05**/MF **A02**

Superfund Record of Decision (EPA Region 5): Algoma Municipal Landfill, Algoma, WI. (First Remedial Action), September 1990.
PB91-921518/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Reilly Tar and Chemical Corporation Site, St. Peter Aquifer, St. Louis Park, MN. (Third Remedial Action), September 1990.
PB91-921519/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 6): Pagano Salvage Site, Los Lunas, NM. (First Remedial Action), September 1990.
PB91-921520/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 6): Arkwood, Inc., Omaha, AR. (First Remedial Action), September 1990.
PB91-921521/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 5): Master Disposal Service Landfill, Brookfield, WI. (First Remedial Action), September 1990.
PB91-921524/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 4): Munisport Landfill Site, Dade County, North Miami, FL. (First Remedial Action), July 1990.
PB91-921525/REB 91-04 PC **A09**/MF **A02**

Superfund Record of Decision (EPA Region 2): Claremont Polychemical, Nassau County, Old Bethpage, NY. (Second Remedial Action), September 1990.
PB91-921526/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 2): Metaltec/Aerosystems, Franklin Borough, Sussex County, NJ. (Second Remedial Action), September 1990.
PB91-921527/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 8): Silver Bow Creek/Butte Area NPL Site, Warm Springs Ponds Operable Unit, Upper Clark Fork River Basin, MT. (First Remedial Action), September 1990.
PB91-921528/REB 91-04 PC **A20**/MF **A04**

Superfund Record of Decision (EPA Region 2): Chemical Leaman Tank Lines Site, Logan Township, Gloucester County, NJ. (First Remedial Action), September 1990.
PB91-921529/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): City Industries, Winter Park, FL. (First Remedial Action), March 1990.
PB91-921530/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 4): Bypass 601 Groundwater Contamination Site (Martin Scrap Recycling Facility), Concord, NC. (First Remedial Action), August 1990.
PB91-921531/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 7): Wheeling Disposal Service Company Landfill, Amazonia, MO. (First Remedial Action), September 1990.
PB91-921532/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 2): Mattiace Petrochemical Company, Broome County, Glen Cove, NY. (First Remedial Action), September 1990.
PB91-921533/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 9): Intel Santa Clara III Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921534/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 9): Intersil/Siemens Superfund Site, Cupertino, CA. (First Remedial Action), September 1990.
PB91-921535/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 4): Howe Valley Landfill, Howe Valley, KY. (First Remedial Action), September 1990.
PB91-921539/REB 91-04 PC **A11**/MF **A03**

Superfund Record of Decision (EPA Region 8): Portland Cement Co. (Kiln Dust No. 2 and No. 3) Operable Unit 1, Salt Lake City, UT. (First Remedial Action), September 1990.
PB91-921540/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 7): Shenandoah Stables, Lincoln County, MO. (Second Remedial Action), September 1990.
PB91-921541/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 10): Fort Lewis Logistics Center, Pierce County, Fort Lewis, WA. (First Remedial Action), September 1990.
PB91-921542/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 6): Cimarron Mining Corporation Site, Operable Unit 1, Lincoln County, Carrizozo, NM. (First Remedial Action), September 1990.
PB91-921543/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision (EPA Region 9): Solvent Service Superfund Site, San Jose, CA. (First Remedial Action), September 1990.
PB91-921544/REB 91-04 PC **A07**/MF **A02**

Superfund Record of Decision (EPA Region 5): Hagen Farm Site, Source Control Operable Unit, Dane County, WI. (First Remedial Action), September 1990.
PB91-921545/REB 91-04 PC **A03**/MF **A01**

Superfund Record of Decision (EPA Region 4): Yellow Water Road Site, Duval County, Baldwin, FL. (First Remedial Action), September 1990.
PB91-921546/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 2): Cinnaminson Groundwater Contamination Site, Burlington County, NJ. (First Remedial Action), September 1990.
PB91-921548/REB 91-04 PC **A08**/MF **A02**

Superfund Record of Decision (EPA Region 2): Syosset Landfill, Nassau County, Syosset, NY. (First Remedial Action), September 1990.
PB91-921549/REB 91-04 PC **A06**/MF **A02**

Superfund Record of Decision (EPA Region 3): Coker's Sanitation Service Landfills, Kent County, DE. (First Remedial Action), September 1990.
PB91-921550/REB 91-04 PC **A05**/MF **A01**

Superfund Record of Decision: (EPA Region 2): Kentucky Avenue Wellfield Site, Town of Horseheads, Chemung County, New York (Second Remedial Action), September 28, 1990.
PB91-921551/REB 91-04 PC **A15**

Superfund Record of Decision (EPA Region 5): Wayne Reclamation and Recycling, Columbia City, Indiana (First Remedial Action), Final Report, March 30, 1990.
PB91-921552/REB 91-04 PC **A05**/MF **A02**

Superfund Record of Decision (EPA Region 5): Spiegelberg Site, Green Oak Township, Livingston County, Michigan (First Remedial Action), Final Report, June 29, 1990.
PB91-921553/REB 91-04 PC **A04**/MF **A01**

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PB91-921353/REB 91-04 PC **A03**/MF **A01**

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PB91-921272/REB 91-04 PC **A18**/MF **A04**

EPA/ROD/R01-90/049
Superfund Record of Decision (EPA Region 1): Baird and McGuire/Alternate Water Supply, Holbrook, MA. (Third Remedial Action), September 1990.
PB91-921419/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R01-90/050
Superfund Record of Decision (EPA Region 1): Beacon Heights Landfill Site, Beacon Falls, CT. (First Remedial Action), September 1990. (Supplemental).
PB91-921418/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R01-90/047
Superfund Record of Decision (EPA Region 1): Coakley Landfill, North Hampton, New Hampshire (First Remedial Action), June 28, 1990.
PB91-921401/REB 91-01 PC **A12**/MF **A02**

EPA/ROD/R01-90/051
Superfund Record of Decision (EPA Region 1): Kearsarge Metallurgical Corporation, Conway, NH. (First Remedial Action), September 1990.
PB91-921416/REB 91-04 PC **A12**/MF **A03**

EPA/ROD/R01-90/033
Superfund Record of Decision (EPA Region 1): Old Springfield Landfill, Springfield, VT. (Second Remedial Action), September 1990.
PB91-921420/REB 91-04 PC **A17**/MF **A04**

EPA/ROD/R01-90/048
Superfund Record of Decision (EPA Region 1): Stamina Mills Site, North Smithfield, RI. (First Remedial Action), September 1990.
PB91-921421/REB 91-04 PC **A10**/MF **A03**

Superfund Record of Decision (EPA Region 1): Tinkham's Garage Site, Londonderry, New Hampshire. (First Remedial Action), March 10, 1989.
PB91-921413/REB 91-01 PC **A05**/MF **A01**

EPA/ROD/R02-90/110
Superfund Record of Decision (EPA Region 2): American Thermostat Site, South Cairo, Green County, New York (Second Remedial Action), Final Report, June 29, 1990.
PB91-921556/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R02-90/114
Superfund Record of Decision (EPA Region 2): Chemical Leaman Tank Lines Site, Logan Township, Gloucester County, NJ. (First Remedial Action), September 1990.
PB91-921529/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R02-90/127
Superfund Record of Decision (EPA Region 2): Cinnaminson Groundwater Contamination Site, Burlington County, NJ. (First Remedial Action), September 1990.
PB91-921548/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R02-90/123
Superfund Record of Decision (EPA Region 2): Claremont Polychemical, Nassau County, Old Bethpage, NY. (Second Remedial Action), September 1990.
PB91-921526/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R02-90/105
Superfund Record of Decision (EPA Region 2): FAA Technical Center, Area 20A - Salvage Yard, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921425/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R02-90/125
Superfund Record of Decision (EPA Region 2): Glen Ridge Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921436/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R02-90/118
Superfund Record of Decision (EPA Region 2): Higgins Farm, Franklin Township, Somerset County, NJ. (First Remedial Action), September 1990.
PB91-921496/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R02-90/121
Superfund Record of Decision (EPA Region 2): Hooker Chemical/Ruco Polymer Site, Hicksville, NY. (First Remedial Action), September 1990.
PB91-921427/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R02-90/117
Superfund Record of Decision (EPA Region 2): Hooker-102nd Street Landfill, Niagara Falls, NY. (First Remedial Action), September 1990.
PB91-921417/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R02-90/128
Superfund Record of Decision (EPA Region 2): Imperial Oil/Champion Chemicals, Marlboro Township, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921498/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R02-90/113
Superfund Record of Decision (EPA Region 2): King of Prussia Technical Corporation Site, Winslow Township, Camden County, NJ. (First Remedial Action), September 1990.
PB91-921503/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R02-90/106
Superfund Record of Decision (EPA Region 2): Lone Pine Landfill, Freehold Township, Monmouth County, NJ. (Second Remedial Action), September 1990.
PB91-921430/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R02-90/108
Superfund Record of Decision (EPA Region 2): M and T DeLisa Landfill Site, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921429/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R02-90/112
Superfund Record of Decision (EPA Region 2): Mannheim Avenue Dump Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921495/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R02-90/119
Superfund Record of Decision (EPA Region 2): Mattiace Petrochemical Company, Broome County, Glen Cove, NY. (First Remedial Action), September 1990.
PB91-921533/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R02-90/116
Superfund Record of Decision (EPA Region 2): Metaltec/Aerosystems, Franklin Borough, Sussex County, NJ. (Second Remedial Action), September 1990.
PB91-921527/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R02-90/126
Superfund Record of Decision (EPA Region 2): Montclair/West Orange Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921431/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R02-90/115
Superfund Record of Decision (EPA Region 2): Myers Property, Franklin Township, NJ. (First Remedial Action), September 1990.
PB91-921428/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R02-90/120
Superfund Record of Decision (EPA Region 2): Pomona Oaks Well Contamination Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921497/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R02-90/103
Superfund Record of Decision (EPA Region 2): Radium Chemical Company Site, Woodside, Queens County, New York (First Remedial Action), Final Report, June 21, 1990.
PB91-921403/REB 91-01 PC **A04**/MF **A01**

EPA/ROD/R02-90/124
Superfund Record of Decision (EPA Region 2): Sarney Farm, Amenia, Dutchess County, NY. (First Remedial Action), September 1990.
PB91-921422/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R02-90/122
Superfund Record of Decision (EPA Region 2): Sayreville Landfill Site, Borough of Sayreville, Middlesex County, New Jersey (First Remedial Action), September 28, 1990.
PB91-921558/REB 91-04 PC **A13**/MF **A03**

EPA/ROD/R02-90/109
Superfund Record of Decision (EPA Region 2): Scientific Chemical Processing Site, Carlstadt, Bergen County, NJ. (First Remedial Action), September 1990.
PB91-921423/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R02-90/104
Superfund Record of Decision (EPA Region 2): Sealand Restoration Site, Town of Lisbon, St. Lawrence County, NY. (First Remedial Action), September 1990.
PB91-921424/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R02-90/111
Superfund Record of Decision (EPA Region 2): Solvent Savers Site, Chenango County, New York (First Remedial Action), Final Report, September 28, 1990.
PB91-921557/REB 91-04 PC **A12**/MF **A03**

EPA/ROD/R02-90/107
Superfund Record of Decision (EPA Region 2): Syosset Landfill, Nassau County, Syosset, NY. (First Remedial Action), September 1990.
PB91-921549/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R02-90/130
Superfund Record of Decision (EPA Region 2): Vestal Water Supply Well No. 1-1, Broome County, Vestal, NY. (Second Remedial Action), September 1990.
PB91-921499/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R02-90/102
Superfund Record of Decision (EPA Region 2): Woodland Township Route 72 and Route 532 Dump Sites, Burlington County, Chatsworth, NJ. (First Remedial Action), May 1990.
PB91-921426/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R02-90/101
Superfund Record of Decision (EPA Region 2): Woodland Township Route 72 Site, Burlington County, New Jersey (First Remedial Action), May 16, 1990.
PB91-921402/REB 91-01 PC **A06**/MF **A01**

EPA/ROD/R03-90/091
Superfund Record of Decision (EPA Region 3): Army Creek Landfill Site, New Castle, Delaware (Second Remedial Action), Final Report, June 29, 1990.
PB91-921408/REB 91-01 PC **A04**/MF **A01**

EPA/ROD/R03-90/093
Superfund Record of Decision (EPA Region 3): Avtex Fibers Site, Front Royal, VA. (Second Remedial Action), September 1990.
PB91-921432/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R03-90/094
Superfund Record of Decision (EPA Region 3): Brown's Battery Breaking Site, Tilden Township, PA. (First Remedial Action), September 1990.
PB91-921437/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R03-90/095
Superfund Record of Decision (EPA Region 3): Butz Landfill Superfund Site, Jackson Township, Monroe County, PA. (First Remedial Action), September 1990.
PB91-921438/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R03-90/096
Superfund Record of Decision (EPA Region 3): Coker's Sanitation Service Landfills, Kent County, DE. (First Remedial Action), September 1990.
PB91-921550/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R03-90/088
Superfund Record of Decision (EPA Region 3): Croyden TCE Site, Bristol Township, Bucks County, PA. (Second Remedial Action), June 1990.
PB91-921435/REB 91-04 PC **A07**/MF **A01**

EPA/ROD/R03-90/088
Superfund Record of Decision (EPA Region 3): Croydon TCE Site, Bucks County, Pennsylvania (Second Remedial Action), Final Report, June 29, 1990.
PB91-921405/REB 91-01 PC **A07**/MF **A01**

EPA/ROD/R03-90/097
Superfund Record of Decision (EPA Region 3): Cryo-Chem Site, Earl Township, Berks County, PA. (Second Remedial Action), September 1990.
PB91-921502/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R03-90/104
Superfund Record of Decision (EPA Region 3): Dover Air Force Base, DE. (First Remedial Action), September 1990.
PB91-921505/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R03-90/103
Superfund Record of Decision (EPA Region 3): East Mt. Zion Landfill, Springettsbury Township, York County, PA. (First Remedial Action), September 1990.
PB91-921441/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R03-90/105
Superfund Record of Decision (EPA Region 3): Fike/Artel Chemical Site, Nitro, WV. (Second Remedial Action), September 1990.
PB91-921433/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R03-90/101
Superfund Record of Decision (EPA Region 3): Keystone Sanitation Landfill Site, Adams County, Union Township, PA. (First Remedial Action), September 1990.
PB91-921434/REB 91-04 PC **A07**/MF **A01**

EPA/ROD/R03-90/090
Superfund Record of Decision (EPA Region 3): Lord-Shope Landfill Site, Erie County, Pennsylvania (First Remedial Action), Final Report, June 29, 1990.
PB91-921407/REB 91-01 PC **A05**/MF **A01**

EPA/ROD/R03-90/099
Superfund Record of Decision (EPA Region 3): Osborne Landfill Site, Pine Township, Mercer County, PA. (First Remedial Action), September 1990.
PB91-921440/REB 91-04 PC **A09**/MF **A01**

EPA/ROD/R03-90/100
Superfund Record of Decision (EPA Region 3): Raymark Site, Hatboro Borough, Montgomery County, PA. (First Remedial Action), September 1990.
PB91-921504/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R03-90/098
Superfund Record of Decision (EPA Region 3): Sand, Gravel and Stone Site, Elkton, MD. (Second Remedial Action), September 1990.
PB91-921439/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R03-90/102
Superfund Record of Decision (EPA Region 3): Tyson Dump Number 1, Upper Merion Township, Montgomery County, PA. (Third Remedial Action), September 1990.
PB91-921516/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R03-90/083
Superfund Record of Decision (EPA Region 3): U.S. Titanium Superfund Site, Nelson County, Virginia (First Remedial Action), Final Report, November 29, 1990.
PB91-921559/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R03-90/087
Superfund Record of Decision (EPA Region 3): W. M. Manufacturing Superfund Site, Danville, Pennsylvania (Second Remedial Action), June 29, 1990.
PB91-921404/REB 91-01 PC **A04**/MF **A01**

EPA/ROD/R03-90/089
Superfund Record of Decision (EPA Region 3): Walsh Landfill Site, Chester County, Pennsylvania (First Remedial Action), June 29, 1990.
PB91-921406/REB 91-01 PC **A05**/MF **A01**

EPA/ROD/R04-90/070
Superfund Record of Decision (EPA Region 4): 62nd Street Dump, Hillsborough County, Tampa, FL. (First Remedial Action), June 1990.
PB91-921507/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R04-90/078
Superfund Record of Decision (EPA Region 4): Bypass 601 Groundwater Contamination Site (Martin Scrap Recycling Facility), Concord, NC. (First Remedial Action), August 1990.
PB91-921531/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R04-90/077
Superfund Record of Decision (EPA Region 4): Cabot Carbon/Koppers Site, Gainesville, Alachua County, FL. (First Remedial Action), September 1990.
PB91-921449/REB 91-04 PC **A07**/MF **A01**

EPA/ROD/R04-90/059
Superfund Record of Decision (EPA Region 4): City Industries, Winter Park, FL. (First Remedial Action), March 1990.
PB91-921530/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R04-90/066
Superfund Record of Decision (EPA Region 4): Coleman Evans Wood Preserving Site, Duval County, Jacksonville, Florida (First Remedial Action (Amendment)), Final Report, September 9, 1990.
PB91-921560/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R04-90/071
Superfund Record of Decision (EPA Region 4): Dubose Oil Products Site, Cantonment, Escambia County, FL. (First Remedial Action), March 1990.
PB91-921444/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R04-90/065
Superfund Record of Decision (EPA Region 4): Harris/Palm Bay Facility, Palm Bay, Brevard County, FL. (First Remedial Action), June 1990.
PB91-921442/REB 91-04 PC **A06**/MF **A01**

EPA/ROD/R04-90/060
Superfund Record of Decision (EPA Region 4): Hipps Road Landfill Site, Duval County, Jacksonville, FL. (First Remedial Action), (Amendment), September 1990.
PB91-921506/REB 91-04 PC **A11**/MF **A03**

EPA/ROD/R04-90/063
Superfund Record of Decision (EPA Region 4): Howe Valley Landfill, Howe Valley, KY. (First Remedial Action), September 1990.
PB91-921539/REB 91-04 PC **A11**/MF **A03**

EPA/ROD/R04-90/072
Superfund Record of Decision (EPA Region 4): Kassouf-Kimerling Battery Site, Tampa, Hillsborough County, FL. (Second Remedial Action), March 1990.
PB91-921445/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R04-90/069
Superfund Record of Decision (EPA Region 4): Lewisburg Dump Site, Lewisburg, Marshall County, Tennessee (First Remedial Action), Final Report, September 19, 1990.
PB91-921561/REB 91-04 PC **A11**/MF **A03**

EPA/ROD/R04-90/062
Superfund Record of Decision (EPA Region 4): Munisport Landfill Site, Dade County, North Miami, FL. (First Remedial Action), July 1990.
PB91-921525/REB 91-04 PC **A09**/MF **A02**

EPA/ROD/R04-90/073
Superfund Record of Decision (EPA Region 4): National Starch and Chemical Corporation Site, Salisbury, NC. (Second Remedial Action), September 1990.
PB91-921446/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R04-90/068
Superfund Record of Decision (EPA Region 4): North Hollywood Dump, TN. (First Remedial Action), September 1990.
PB91-921443/REB 91-04 PC **A13**/MF **A02**

EPA/ROD/R04-90/075
Superfund Record of Decision (EPA Region 4): Pickettville Road Landfill, Jacksonville, Duval County, FL. (First Remedial Action), September 1990.
PB91-921448/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R04-90/061
Superfund Record of Decision (EPA Region 4): Schuylkill Metal, Hillsborough County, Plant City, FL. (First Remedial Action), September 1990.
PB91-921501/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R04-90/074
Superfund Record of Decision (EPA Region 4): SCRDI Bluff Road Site, Columbia, Richland County, SC. (First Remedial Action), September 1990.
PB91-921447/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R04-90/067
Superfund Record of Decision (EPA Region 4): Yellow Water Road Site, Duval County, Baldwin, FL. (First Remedial Action), September 1990.
PB91-921546/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R04-90/076
Superfund Record of Decision (EPA Region 4): Zellwood Groundwater Contamination Site, (Operable Unit 1), Orange County, Zellwood, FL. (First Remedial Action), (Amendment), March 1990.
PB91-921508/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/145
Superfund Record of Decision (EPA Region 5): Algoma Municipal Landfill, Algoma, WI. (First Remedial Action), September 1990.
PB91-921518/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/137
Superfund Record of Decision (EPA Region 5): Anderson Development Company Site, Adrian, Michigan (First Remedial Action), Final Report, September 28, 1990.
PB91-921562/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/150
Superfund Record of Decision (EPA Region 5): Bofors-Nobel Site, Muskegon, MI. (First Remedial Action), September 1990.
PB91-921466/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/140
Superfund Record of Decision (EPA Region 5): Clare Water Supply, Clare County, MI. (First Remedial Action), August 1990.
PB91-921459/REB 91-04 PC **A03**/MF **A01**

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EPA/ROD/R05-90/128
Superfund Record of Decision (EPA Region 5): Fisher-Calo Chem, Kingsbury, IN. (First Remedial Action), August 1990.
PB91-921451/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/127
Superfund Record of Decision (EPA Region 5): Hagen Farm Site, Source Control Operable Unit, Dane County, WI. (First Remedial Action), September 1990.
PB91-921545/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R05-90/148
Superfund Record of Decision (EPA Region 5): Hunts Disposal Landfill Site, Town of Caledonia, WI. (First Remedial Action), September 1990.
PB91-921464/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/133
Superfund Record of Decision (EPA Region 5): K and L Landfill, Kalamazoo, MI. (First Remedial Action), September 1990.
PB91-921454/REB 91-04 PC **A02**/MF **A01**

EPA/ROD/R05-90/134
Superfund Record of Decision (EPA Region 5): Kummer Sanitary Landfill, Northern Township, Beltrami County, MN. (Third Remedial Action), September 1990.
PB91-921547/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/146
Superfund Record of Decision (EPA Region 5): Master Disposal Service Landfill, Brookfield, WI. (First Remedial Action), September 1990.
PB91-921524/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/144
Superfund Record of Decision (EPA Region 5): Metamora Landfill, Metamora, Lapeer County, MI. (Second Remedial Action), September 1990.
PB91-921463/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/142
Superfund Record of Decision (EPA Region 5): Moss-American Kerr-McGee Oil Site, Milwaukee, WI. (First Remedial Action), September 1990.
PB91-921461/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R05-90/138
Superfund Record of Decision (EPA Region 5): National Presto Industries, Eau Claire, WI. (First Remedial Action), August 1990.
PB91-921457/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/136
Superfund Record of Decision (EPA Region 5): Naval Industrial Reserve Ordnance Plant, Fridley, MN. (First Remedial Action), September 1990.
PB91-921456/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/121
Superfund Record of Decision (EPA Region 5): NL Industries/Taracorp Lead Smelting, Granite City, IL. (First Remedial Action), March 1990.
PB91-921515/REB 91-04 PC **A09**/MF **A03**

EPA/ROD/R05-90/129
Superfund Record of Decision (EPA Region 5): Oconomowoc Electroplating Company Site, Ashippun, WI. (First Remedial Action), September 1990.
PB91-921517/REB 91-04 PC **A05**/MF **A02**

EPA/ROD/R05-90/125
Superfund Record of Decision (EPA Region 5): Onalaska Municipal Landfill Site, Lacrosse County, Wisconsin (First Remedial Action), Final Report, August 14, 1990.
PB91-921410/REB 91-01 PC **A06**/MF **A01**

EPA/ROD/R05-90/135
Superfund Record of Decision (EPA Region 5): Ott/Story/Cordova Chemical Site, North Muskegon, MI. (Second Remedial Action), September 1990.
PB91-921455/REB 91-04 PC **A05**/MF **A02**

EPA/ROD/R05-90/147
Superfund Record of Decision (EPA Region 5): Reilly Tar and Chemical Corporation Site, St. Peter Aquifer, St. Louis Park, MN. (Third Remedial Action), September 1990.
PB91-921519/REB 91-04 PC **A04**/MF **A01**

Superfund Record of Decision (EPA Region 5): Rose Township, Oakland County, Michigan. (First Remedial Action), September 18, 1989.
PB91-921412/REB 91-01 PC **A03**/MF **A01**

EPA/ROD/R05-90/124
Superfund Record of Decision (EPA Region 5): Sangamo/Crab Orchard National Wildlife Refuge (USDOI), Carterville, IL. (First Remedial Action), August 1990.
PB91-921509/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R05-90/143
Superfund Record of Decision (EPA Region 5): Springfield Township Dump Site, Oakland County, MI. (First Remedial Action), September 1990.
PB91-921462/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R05-90/139
Superfund Record of Decision (EPA Region 5): St. Louis River/Interlake/Duluth Tar Site, Duluth, MN. (First Remedial Action), September 1990.
PB91-921458/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/122
Superfund Record of Decision (EPA Region 5): Tri-State Plating, Columbus, IN. (First Remedial Action), March 1990.
PB91-921450/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R05-90/149
Superfund Record of Decision (EPA Region 5): Union Scrap Iron Metal, Hennepin County, Minneapolis, MN. (First Remedial Action), March 1990.
PB91-921465/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R05-90/141
Superfund Record of Decision (EPA Region 5): University of Minnesota Rosemount Research Center, MN. (First Remedial Action), June 1990.
PB91-921460/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R05-90/130
Superfund Record of Decision (EPA Region 5): Wheeler Pit Site, La Prairie Township, WI. (First Remedial Action), September 1990.
PB91-921452/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/064
Superfund Record of Decision (EPA Region 6): Arkwood, Inc., Omaha, AR. (First Remedial Action), September 1990.
PB91-921521/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R06-90/060
Superfund Record of Decision (EPA Region 6): Cimarron Mining Corporation Site, Operable Unit 1, Lincoln County, Carrizozo, NM. (First Remedial Action), September 1990.
PB91-921543/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/062
Superfund Record of Decision (EPA Region 6): Crystal Chemical Site, Houston, TX. (First Remedial Action), September 1990.
PB91-921510/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R06-90/055
Superfund Record of Decision (EPA Region 6): Jacksonville Municipal Landfill Superfund Site, AR. (First Remedial Action), September 1990.
PB91-921467/REB 91-04 PC **A09**/MF **A02**

EPA/ROD/R06-90/058
Superfund Record of Decision (EPA Region 6): Pagano Salvage Site, Los Lunas, NM. (First Remedial Action), September 1990.
PB91-921520/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R06-90/063
Superfund Record of Decision (EPA Region 6): Rogers Road Municipal Landfill, Pulaski County, Arkansas (First Remedial Action), Final Report, September 27, 1990.
PB91-921563/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R06-90/059
Superfund Record of Decision (EPA Region 6): Tenth Street Dump/Junkyard, Oklahoma City, OK. (First Remedial Action), September 1990.
PB91-921469/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/057
Superfund Record of Decision (EPA Region 6): Texarkana Wood Preserving Company, Texarkana, Bowie County, TX. (First Remedial Action), September 1990.
PB91-921468/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/061
Superfund Record of Decision (EPA Region 6): Tinker AFB (Soldier Creek/Bldg. 3001), OK. (First Remedial Action), August 1990.
PB91-921470/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R06-90/056
Superfund Record of Decision (EPA Region 6): Vertac, Inc., Jacksonville, AR. (First Remedial Action), September 1990.
PB91-921513/REB 91-04 PC **A09**/MF **A02**

EPA/ROD/R07-90/041
Superfund Record of Decision (EPA Region 7): Fairfield Coal Gasification Site, Fairfield, IA. (First Remedial Action), September 1990.
PB91-921478/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R07-90/034
Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination (East Industrial Park), NE (First Remedial Action), September 1990.
PB91-921472/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R07-90/035
Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination FAR-MAR-CO Subsite, Hastings Irrigation Pipe Company TCA Soils Operable Unit, Hastings, NE. (Second Remedial Action), September 1990.
PB91-921473/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/036
Superfund Record of Decision (EPA Region 7): Lindsay Manufacturing Company, Lindsay, NE. (First Remedial Action), September 1990.
PB91-921474/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R07-90/037
Superfund Record of Decision (EPA Region 7): Midwest Manufacturing/North Farm Site, Midwest Operable Unit, Kellogg, IA. (First Remedial Action), September 1990.
PB91-921475/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R07-90/038
Superfund Record of Decision (EPA Region 7): Missouri Electric Works Site, Cape Girardeau, MO. (First Remedial Action), September 1990.
PB91-921476/REB 91-04 PC **A05**/MF **A02**

EPA/ROD/R07-90/033
Superfund Record of Decision (EPA Region 7): Northwestern States Portland Cement Company Site, Mason City, IA. (First Remedial Action), June 1990.
PB91-921471/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/042
Superfund Record of Decision (EPA Region 7): Shenandoah Stables, Lincoln County, MO. (Second Remedial Action), September 1990.
PB91-921541/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/039
Superfund Record of Decision (EPA Region 7): Waverly Ground Water Contamination Site, Waverly, NE. (First Remedial Action), September 1990.
PB91-921477/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/043
Superfund Record of Decision (EPA Region 7): Weldon Spring Quarry/Plant/Pits (USDOE), Weldon Spring, MO. (Second Remedial Action), September 1990.
PB91-921564/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R07-90/044
Superfund Record of Decision (EPA Region 7): Wheeling Disposal Service Company Landfill, Amazonia, MO. (First Remedial Action), September 1990.
PB91-921532/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R07-90/040
Superfund Record of Decision (EPA Region 7): White Farm Equipment Company Dump Site, Floyd County, Charles City, IA. (First Remedial Action), September 1990.
PB91-921514/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R08-90/035
Superfund Record of Decision (EPA Region 8): Martin Marietta Astronautics Group Site, Waterton, CO. (First Remedial Action), September 1990.
PB91-921483/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R08-90/034
Superfund Record of Decision (EPA Region 8): Monticello Mill Tailings Site, San Juan County, UT. (First Remedial Action), August 1990.
PB91-921482/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/033
Superfund Record of Decision (EPA Region 8): Mystery Bridge at Highway 20, Natrona County, WY. (First Remedial Action), September 1990.
PB91-921481/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R08-90/032
Superfund Record of Decision (EPA Region 8): Ogden Defense Depot (Operable Unit 2), Weber County, Ogden, UT. (First Remedial Action), September 1990.
PB91-921480/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R08-90/029
Superfund Record of Decision (EPA Region 8): Portland Cement Co. (Kiln Dust No. 2 and No. 3) Operable Unit 1, Salt Lake City, UT. (First Remedial Action), September 1990.
PB91-921540/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R08-90/043
Superfund Record of Decision (EPA Region 8): Rocky Flats Plant (DOE), Northern Jefferson County, CO. (First Remedial Action), January 1990.
PB91-921487/REB 91-04 PC **A19**/MF **A04**

EPA/ROD/R08-90/036
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 16), CO. (Second Remedial Action), February 1990.
PB91-921484/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R08-90/038
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 18), CO. (Third Remedial Action), February 1990.
PB91-921485/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/040
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 20), CO. (Fifth Remedial Action), March 1990.
PB91-921486/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R08-90/041
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 22), Colorado (Sixth Remedial Action), Final Report, May 3, 1990.
PB91-921554/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/037
Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 17), CO. (Eighth Remedial Action), February 1990.
PB91-921512/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/039
Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 19), CO. (Fourth Remedial Action), February 1990.
PB91-921511/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R08-90/031
Superfund Record of Decision (EPA Region 8): Sand Creek Industrial Site, Commerce City, CO. (Second Remedial Action), September 1990.
PB91-921479/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/044
Superfund Record of Decision (EPA Region 8): Sharon Steel (Midvale Tailings), Midvale, UT. (First Remedial Action), September 1990.
PB91-921488/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R08-90/030
Superfund Record of Decision (EPA Region 8): Silver Bow Creek/Butte Area NPL Site, Warm Springs Ponds Operable Unit, Upper Clark Fork River Basin, MT. (First Remedial Action), September 1990.
PB91-921528/REB 91-04 PC **A20**/MF **A04**

EPA/ROD/R08-90/028
Superfund Record of Decision (EPA Region 8): Whitewood Creek Site, Lawrence, Meade, and Butte

Counties, South Dakota (First Remedial Action), Final Report, March 30, 1990.
PB91-921409/REB 91-01 PC **A05**/MF **A01**

EPA/ROD/R09-90/054
Superfund Record of Decision (EPA Region 9): Applied Materials, Inc., Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921492/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R09-90/049
Superfund Record of Decision (EPA Region 9): Coalinga Asbestos Mine, Fresno County, CA. (Second Remedial Action), September 1990.
PB91-921523/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R09-89/038
Superfund Record of Decision (EPA Region 9): Coast Wood Preserving, Inc., Ukiah, CA. (First Remedial Action, September 1989).
PB91-921415/REB 91-01 PC **A15**/MF **A02**

EPA/ROD/R09-90/055
Superfund Record of Decision (EPA Region 9): Intel Santa Clara III Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921534/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R09-90/052
Superfund Record of Decision (EPA Region 9): Intersil/ Siemens Superfund Site, Cupertino, CA. (First Remedial Action), September 1990.
PB91-921535/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R09-90/047
Superfund Record of Decision (EPA Region 9): J. H. Baxter Superfund Site, Weed, CA. (First Remedial Action), September 1990.
PB91-921489/REB 91-04 PC **A10**/MF **A03**

EPA/ROD/R09-90/053
Superfund Record of Decision (EPA Region 9): Louisiana-Pacific Corporation, Oroville, CA. (First Remedial Action), September 1990.
PB91-921491/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R09-90/055
Superfund Record of Decision (EPA Region 9): Operating Industries, Inc., Monterey Park, CA. (Third Remedial Action), September 1990 (Amendment).
PB91-921493/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R09-90/050
Superfund Record of Decision (EPA Region 9): Solvent Service Superfund Site, San Jose, CA. (First Remedial Action), September 1990.
PB91-921544/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R09-90/048
Superfund Record of Decision (EPA Region 9): Stringfellow Hazardous Waste Site, Riverside County, CA. (Fourth Remedial Action), September 1990.
PB91-921490/REB 91-04 PC **A03**/MF **A01**

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PB91-921411/REB 91-01 PC **A03**/MF **A01**

EPA/ROD/R10-90/024
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PB91-921494/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R10-90/025
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PB91-921542/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R10-90/021
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PB91-116053/REB 91-01 PC **A02**/MF **A01**

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PB91-109355/REB 91-01 PC **A02**/MF **A01**

EPA/600/J-88/545
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PB91-109264/REB 91-01 PC **A02**/MF **A01**

EPA/600/J-91/019
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PB91-183475/REB 91-01 PC **A03**/MF **A01**

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PB91-191551/REB 91-01 PC **A03**/MF **A01**

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PB91-199851/REB 91-01 PC **A03**/MF **A01**

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PB91-231324/REB 91-04 PC **A02**/MF **A01**

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PB91-109694/REB 91-01 PC **A03**/MF **A01**

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PB91-182139/REB 91-01 PC **A03**/MF **A01**

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PB91-199901/REB 91-01 PC **A03**/MF **A01**

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PB91-109314/REB 91-01 PC **A03**/MF **A01**

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PB91-171793/REB 91-01 PC **A03**/MF **A01**

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PB91-242586/REB 91-04 PC **A03**/MF **A01**

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PB91-115972/REB 91-01 PC **A02**/MF **A01**

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PB91-242578/REB 91-04 PC **A02**/MF **A01**

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PB91-163626/REB 91-01 PC **A03**/MF **A01**

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PB91-200295/REB 91-01 PC **A02**/MF **A01**

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PB91-171769/REB 91-01 PC **A02**/MF **A01**

EPA/600/J-91/213
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PB91-132985/REB 91-01 PC **A02**/MF **A01**

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PB91-109322/REB 91-01 PC **A02**/MF **A01**

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EPA/600/J-90/355
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PB91-211490/REB 91-04 PC **A03**/MF **A01**

EPA/600/J-88/549
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PB91-116046/REB 91-01 PC **A03**/MF **A01**

EPA/600/J-90/134
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PB91-196121/REB 91-01 PC **A06**/MF **A01**

EPA/600/J-89/455
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PB91-109470/REB 91-01 PC **A03**/MF **A01**

EPA/600/J-91/182
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PB91-233452/REB 91-04 PC **A03**/MF **A01**

EPA/600/J-90/427
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PB91-171827/REB 91-01 PC **A02**/MF **A01**

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PB91-109595/REB 91-01 PC **A02**/MF **A01**

EPA/600/J-90/279
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PB91-145078/REB 91-01 PC **A03**/MF **A01**

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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Spring Sunday, 1985.
PB91-506006/REB 91-01 CP **T03**

EPA/DF/MT-91/054
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Summer Saturday, 1985.
PB91-506089/REB 91-01 CP **T03**

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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Summer Sunday, 1985.
PB91-506121/REB 91-01 CP **T03**

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NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Summer Weekday, 1985.
PB91-506048/REB 91-01 CP **T03**

EPA/DF/MT-91/015
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Winter Sunday, 1985.
PB91-505693/REB 91-01 CP **T03**

EPA/DF/MT-91/051
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Source Modelers' Tape - Summer Weekday, 1985.
PB91-506055/REB 91-01 CP **T02**

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NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Fall Saturday, 1985.
PB91-505750/REB 91-01 CP **T02**

EPA/DF/MT-91/025
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Fall Sunday, 1985.
PB91-505792/REB 91-01 CP **T02**

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PB91-506170/REB 91-01 CP **T02**

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PB91-506014/REB 91-01 CP **T02**

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PB91-505701/REB 91-01 CP **T02**

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PB91-505628/REB 91-01 CP **T02**

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PB91-506063/REB 91-01 CP **T02**

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PB91-505768/REB 91-01 CP **T02**

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PB91-505800/REB 91-01 CP **T02**

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NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Fall Weekday, 1985.
PB91-505727/REB 91-01 CP **T02**

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PB91-505941/REB 91-01 CP **T02**

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PB91-505677/REB 91-01 CP **T02**

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PB90-213414/REB 91-01 PC **A11**/MF **A02**

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ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MI. CONTROL TECHNOLOGY AND APPLICATIONS BRANCH.

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NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Winter Saturday, 1985.
(EPA/DF/MT-91/012)
PB91-505669/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Winter Saturday, 1985.
(EPA/DF/MT-91/013)
PB91-505677/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tape, 1985.
(EPA/DF/MT-91/014)
PB91-505685/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Winter Sunday, 1985.
(EPA/DF/MT-91/015)
PB91-505693/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Winter Sunday, 1985.
(EPA/DF/MT-91/016)
PB91-505701/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Winter Sunday, 1985.
(EPA/DF/MT-91/017)
PB91-505719/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Fall Weekday, 1985.
(EPA/DF/MT-91/018)
PB91-505727/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Fall Saturday, 1985.
(EPA/DF/MT-91/019)
PB91-505735/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tape - Fall Saturday, 1985.
(EPA/DF/MT-91/020)
PB91-505743/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Fall Saturday, 1985.
(EPA/DF/MT-91/021)
PB91-505750/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Fall Saturday, 1985.
(EPA/DF/MT-91/022)
PB91-505768/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Fall Sunday, 1985.
(EPA/DF/MT-91/023)
PB91-505776/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tape - Fall Sunday, 1985.
(EPA/DF/MT-91/024)
PB91-505784/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Fall Sunday, 1985.
(EPA/DF/MT-91/025)
PB91-505792/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Fall Sunday, 1985.
(EPA/DF/MT-91/026)
PB91-505800/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Winter Weekday, 1985.
(EPA/DF/MT-91/027)
PB91-505818/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Winter Saturday, 1985.
(EPA/DF/MT-91/028)
PB91-505826/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Winter Sunday, 1985.
(EPA/DF/MT-91/029)
PB91-505834/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Spring Weekday, 1985.
(EPA/DF/MT-91/030)
PB91-505842/REB 91-01 CP **T02**

Annual NAPAP Emissions Inventory (Version 2): U.S. Annual Point Sources, 1985.
(EPA/DF/MT-91/031)
PB91-505859/REB 91-01 CP **T02**

Annual NAPAP Emissions Inventory (Version 2): Canadian Annual Point Sources, 1985.
(EPA/DF/MT-91/032)
PB91-505867/REB 91-01 CP **T02**

NAPAP Annual Emissions Inventory (Version 2): U.S. Annual Area Sources, 1985.
(EPA/DF/MT-91/033)
PB91-505875/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): Canadian Annual Area Sources, 1985.
(EPA/DF/MT-91/034)
PB91-505883/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. Annual Natural Particulate Sources, 1985.
(EPA/DF/MT-91/035)
PB91-505891/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): Canadian Annual Natural Particulate Sources, 1985.
(EPA/DF/MT-91/036)
PB91-505909/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Spring Weekday, 1985.
(EPA/DF/MT-91/037)
PB91-505917/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tape - Spring Weekday, 1985.
(EPA/DF/MT-91/038)
PB91-505925/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Spring Weekday, 1985.
(EPA/DF/MT-91/039)
PB91-505933/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Spring Weekday, 1985.
(EPA/DF/MT-91/040)
PB91-505941/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Spring Saturday, 1985.
(EPA/DF/MT-91/041)
PB91-505958/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Spring Saturday, 1985.
(EPA/DF/MT-91/042)
PB91-505966/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Spring Saturday, 1985.
(EPA/DF/MT-91/043)
PB91-505974/REB 91-01 CP **T02**

NAPAP Emissions Enventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Spring Saturday, 1985.
(EPA/DF/MT-91/044)
PB91-505982/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Spring Sunday, 1985.
(EPA/DF/MT-91/045)
PB91-505990/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Spring Sunday, 1985.
(EPA/DF/MT-91/046)
PB91-506006/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Spring Sunday, 1985.
(EPA/DF/MT-91/047)
PB91-506014/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Nonmobile Sources Modelers' Tape - Spring Sunday, 1985.
(EPA/DF/MT-91/048)
PB91-506022/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Summer Weekday, 1985.
(EPA/DF/MT-91/049)
PB91-506030/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Summer Weekday, 1985.
(EPA/DF/MT-91/050)
PB91-506048/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Source Modelers' Tape - Summer Weekday, 1985.
(EPA/DF/MT-91/051)
PB91-506055/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Nonmobile Sources Modelers' Tape - Summer Weekday, 1985.
(EPA/DF/MT-91/052)
PB91-506063/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Summer Saturday, 1985.
(EPA/DF/MT-91/053)
PB91-506071/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Summer Saturday, 1985.
(EPA/DF/MT-91/054)
PB91-506089/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Summer Saturday, 1985.
(EPA/DF/MT-91/055)
PB91-506097/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Nonmobile Sources Modelers' Tape - Summer Saturday, 1985.
(EPA/DF/MT-91/056)
PB91-506105/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Summer Sunday, 1985.
(EPA/DF/MT-91/057)
PB91-506113/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Summer Sunday, 1985.
(EPA/DF/MT-91/058)
PB91-506121/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Summer Sunday, 1985.
(EPA/DF/MT-91/059)
PB91-506139/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Summer Sunday, 1985.
(EPA/DF/MT-91/060)
PB91-506147/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers; Tapes - Fall Weekday, 1985.
(EPA/DF/MT-91/061)
PB91-506154/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Fall Weekday, 1985.
(EPA/DF/MT-91/062)
PB91-506162/REB 91-01 CP **T03**

NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Fall Weekday, 1985.
(EPA/DF/MT-91/063)
PB91-506170/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Spring Saturday, 1985.
(EPA/DF/MT-91/064)
PB91-506188/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Spring Sunday, 1985.
(EPA/DF/MT-91/065)
PB91-506196/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Summer Weekday, 1985.
(EPA/DF/MT-91/066)
PB91-506204/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Summer Saturday, 1985.
(EPA/DF/MT-91/067)
PB91-506212/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Summer Sunday, 1985.
(EPA/DF/MT-91/068)
PB91-506220/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Fall Weekday, 1985.
(EPA/DF/MT-91/069)
PB91-506238/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Fall Saturday, 1985.
(EPA/DF/MT-91/070)
PB91-506246/REB 91-01 CP **T02**

NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Fall Sunday, 1985.
(EPA/DF/MT-91/071)
PB91-506253/REB 91-01 CP **T02**

Retrofit Costs for SO2 and NOX Control Options at Coal-Fired Plants (for Microcomputers).
(EPA/DF/DK-91/073)
PB91-506295/REB 91-01 CP **D02**

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PB91-506469/REB 91-01 CP **D02**

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(EPA/SW/DK-91/075)
PB91-506477/REB 91-01 CP **D03**

Landfill Air Emissions Estimation Model, Version 1.1 (for Microcomputers).
(EPA/SW/DK-91/081)
PB91-507541/REB 91-01 CP **D02**

Exposure Version 2: A Computer Model for Analyzing the Effects of Indoor Air Pollutant Sources (for Microcomputers).
(EPA/SW/DK-91/088)
PB91-507764/REB 91-04 CP **D03**

Indoor Air Quality Simulator for Personal Computers, (Version 1) (for Microcomputers).
(EPA/SW/DK-91/092)
PB91-507871/REB 91-04 CP **D03**

ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, NC. ATMOSPHERIC RESEARCH AND EXPOSURE ASSESSMENT LAB.

EPA/600/3-90/083
Adaptation of the Advanced Statistical Trajectory Regional Air Pollution (ASTRAP) Model to the EPA VAX Computer: Modifications and Testing.
PB91-127720/REB 91-01 PC **A03**/MF **A01**

EPA/600/3-91/002
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PB91-144667/REB 91-01 PC **A06**/MF **A01**

EPA/600/3-91/015
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PB91-168401/REB 91-01 PC **A05**/MF **A01**

EPA/600/8-90/084
User's Guide to the Personal Computer Version of the Biogenic Emissions Inventory System (PC-BEIS).
PB91-136549/REB 91-01 PC **A04**/MF **A01**

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PB91-179069/REB 91-01 PC **A03**/MF **A01**

EPA/600/9-91/020
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EPA/600/D-90/172
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PB91-131698/REB 91-01 PC **A02**/MF **A01**

EPA/600/D-90/174
Oxygenated Organic Compound Concentrations Near a Roadway in Lithuania, SSR.
PB91-131672/REB 91-01 PC **A03**/MF **A01**

EPA/600/D-90/199
Control of Motor Vehicle Emissions - The U.S. Experience.
PB91-136911/REB 91-01 PC **A03**/MF **A01**

EPA/600/D-90/200
Analysis of Ozone Air Quality Over the New York Metropolitan Area.
PB91-137026/REB 91-01 PC **A03**/MF **A01**

EPA/600/D-90/202
Non-Polar Volatile Organic Compounds in Whole Air Samples from the AutoEx Studies.
PB91-137042/REB 91-01 PC **A03**/MF **A01**

EPA/600/D-90/235
Evaluation of the EPA Complex Terrain Dispersion Model (CTDMPLUS) with the Lovett Power Plant Data Base.
PB91-162503/REB 91-01 PC **A03**/MF **A01**

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Advanced Screening Model for Complex Terrain Applications.
PB91-162693/REB 91-01 PC **A03**/MF **A01**

EPA/600/D-91/044
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PB91-176966/REB 91-01 PC **A03**/MF **A01**

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PB91-182824/REB 91-01 PC **A03**/MF **A01**

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PB91-182832/REB 91-01 PC **A03**/MF **A01**

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PB91-182857/REB 91-01 PC **A03**/MF **A01**

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Overview of the Technical Implications of Methanol and Ethanol as Highway Motor Vehicle Fuels.
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PB91-182907/REB 91-01 PC **A02**/MF **A01**

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PB91-191148/REB 91-01 PC **A03**/MF **A01**

EPA/600/D-91/102
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PB91-196022/REB 91-01 PC **A02**/MF **A01**

EPA/600/D-91/104
Bake-Out of a Portion of a New High-Rise Office Building.
PB91-196048/REB 91-01 PC **A03**/MF **A01**

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PB91-196055/REB 91-01 PC **A02**/MF **A01**

EPA/600/D-91/106
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PB91-196063/REB 91-01 PC **A02**/MF **A01**

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PB91-211326/REB 91-04 PC **A03**/MF **A01**

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PB91-211334/REB 91-04 PC **A03**/MF **A01**

EPA/600/D-91/121
Workplace Characteristics Associated with Health and Comfort Concerns in Three Office Buildings in Washington, DC.
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PB91-242933/REB 91-04 PC **A03**/MF **A01**

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Field Strategy for Sorting Volatile Organics into Source-Related Groups.
PB91-146357/REB 91-01 PC **A02**/MF **A01**

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UNIPALS: Software for Principal Components Analysis and Partial Least Squares Regression.
PB91-146365/REB 91-01 PC **A03**/MF **A01**

EPA/600/J-89/498
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PB91-146373/REB 91-01 PC **A03**/MF **A01**

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PB91-144717/REB 91-01 PC **A03**/MF **A01**

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PB91-109926/REB 91-01 PC **A03**/MF **A01**

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PB91-109942/REB 91-01 PC **A02**/MF **A01**

EPA/600/J-90/184
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PB91-116822/REB 91-01 PC **A02**/MF **A01**

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PB91-116814/REB 91-01 PC **A03**/MF **A01**

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PB91-117184/REB 91-01 PC **A03**/MF **A01**

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PB91-146571/REB 91-01 PC **A03**/MF **A01**

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PB91-921497/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R02-90/121
Superfund Record of Decision (EPA Region 2): Hooker Chemical/Ruco Polymer Site, Hicksville, NY. (First Remedial Action), September 1990.
PB91-921427/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R02-90/122
Superfund Record of Decision (EPA Region 2): Sayreville Landfill Site, Borough of Sayreville, Middlesex County, New Jersey (First Remedial Action), September 28, 1990.
PB91-921558/REB 91-04 PC **A13**/MF **A03**

EPA/ROD/R02-90/123
Superfund Record of Decision (EPA Region 2): Claremont Polychemical, Nassau County, Old Bethpage, NY. (Second Remedial Action), September 1990.
PB91-921526/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R02-90/124
Superfund Record of Decision (EPA Region 2): Sarney Farm, Amenia, Dutchess County, NY. (First Remedial Action), September 1990.
PB91-921422/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R02-90/125
Superfund Record of Decision (EPA Region 2): Glen Ridge Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921436/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R02-90/126
Superfund Record of Decision (EPA Region 2): Montclair/West Orange Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921431/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R02-90/127
Superfund Record of Decision (EPA Region 2): Cinnaminson Groundwater Contamination Site, Burlington County, NJ. (First Remedial Action), September 1990.
PB91-921548/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R02-90/128
Superfund Record of Decision (EPA Region 2): Imperial Oil/Champion Chemicals, Marlboro Township, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921498/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R02-90/129
Superfund Record of Decision: (EPA Region 2): Kentucky Avenue Wellfield Site, Town of Horseheads, Chemung County, New York (Second Remedial Action), September 28, 1990.
PB91-921551/REB 91-04 PC **A15**

EPA/ROD/R02-90/130
Superfund Record of Decision (EPA Region 2): Vestal Water Supply Well No. 1-1, Broome County, Vestal, NY. (Second Remedial Action), September 1990.
PB91-921499/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R03-90/087
Superfund Record of Decision (EPA Region 3): W. M. Manufacturing Superfund Site, Danville, Pennsylvania (Second Remedial Action), June 29, 1990.
PB91-921404/REB 91-01 PC **A04**/MF **A01**

EPA/ROD/R03-90/088
Superfund Record of Decision (EPA Region 3): Croydon TCE Site, Bucks County, Pennsylvania (Second Remedial Action), Final Report, June 29, 1990.
PB91-921405/REB 91-01 PC **A07**/MF **A01**

EPA/ROD/R03-90/088
Superfund Record of Decision (EPA Region 3): Croyden TCE Site, Bristol Township, Bucks County, PA. (Second Remedial Action), June 1990.
PB91-921435/REB 91-04 PC **A07**/MF **A01**

EPA/ROD/R03-90/089
Superfund Record of Decision (EPA Region 3): Walsh Landfill Site, Chester County, Pennsylvania (First Remedial Action), June 29, 1990.
PB91-921406/REB 91-01 PC **A05**/MF **A01**

EPA/ROD/R03-90/090
Superfund Record of Decision (EPA Region 3): Lord-Shope Landfill Site, Erie County, Pennsylvania (First Remedial Action), Final Report, June 29, 1990.
PB91-921407/REB 91-01 PC **A05**/MF **A01**

EPA/ROD/R03-90/091
Superfund Record of Decision (EPA Region 3): Army Creek Landfill Site, New Castle, Delaware (Second Remedial Action), Final Report, June 29, 1990.
PB91-921408/REB 91-01 PC **A04**/MF **A01**

EPA/ROD/R03-90/093
Superfund Record of Decision (EPA Region 3): Avtex Fibers Site, Front Royal, VA. (Second Remedial Action), September 1990.
PB91-921432/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R03-90/094
Superfund Record of Decision (EPA Region 3): Brown's Battery Breaking Site, Tilden Township, PA. (First Remedial Action), September 1990.
PB91-921437/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R03-90/095
Superfund Record of Decision (EPA Region 3): Butz Landfill Superfund Site, Jackson Township, Monroe County, PA. (First Remedial Action), September 1990.
PB91-921438/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R03-90/096
Superfund Record of Decision (EPA Region 3): Coker's Sanitation Service Landfills, Kent County, DE. (First Remedial Action), September 1990.
PB91-921550/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R03-90/097
Superfund Record of Decision (EPA Region 3): Cryo-Chem Site, Earl Township, Berks County, PA. (Second Remedial Action), September 1990.
PB91-921502/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R03-90/098
Superfund Record of Decision (EPA Region 3): Sand, Gravel and Stone Site, Elkton, MD. (Second Remedial Action), September 1990.
PB91-921439/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R03-90/099
Superfund Record of Decision (EPA Region 3): Osborne Landfill Site, Pine Township, Mercer County, PA. (First Remedial Action), September 1990.
PB91-921440/REB 91-04 PC **A09**/MF **A01**

EPA/ROD/R03-90/100
Superfund Record of Decision (EPA Region 3): Raymark Site, Hatboro Borough, Montgomery County, PA. (First Remedial Action), September 1990.
PB91-921504/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R03-90/101
Superfund Record of Decision (EPA Region 3): Keystone Sanitation Landfill Site, Adams County, Union Township, PA. (First Remedial Action), September 1990.
PB91-921434/REB 91-04 PC **A07**/MF **A01**

EPA/ROD/R03-90/102
Superfund Record of Decision (EPA Region 3): Tyson Dump Number 1, Upper Merion Township, Montgomery County, PA. (Third Remedial Action), September 1990.
PB91-921516/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R03-90/103
Superfund Record of Decision (EPA Region 3): East Mt. Zion Landfill, Springettsbury Township, York County, PA. (First Remedial Action), September 1990.
PB91-921441/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R03-90/104
Superfund Record of Decision (EPA Region 3): Dover Air Force Base, DE. (First Remedial Action), September 1990.
PB91-921505/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R03-90/105
Superfund Record of Decision (EPA Region 3): Fike/Artel Chemical Site, Nitro, WV. (Second Remedial Action), September 1990.
PB91-921433/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R04-90/059
Superfund Record of Decision (EPA Region 4): City Industries, Winter Park, FL. (First Remedial Action), March 1990.
PB91-921530/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R04-90/060
Superfund Record of Decision (EPA Region 4): Hipps Road Landfill Site, Duval County, Jacksonville, FL. (First Remedial Action), (Amendment), September 1990.
PB91-921506/REB 91-04 PC **A11**/MF **A03**

EPA/ROD/R04-90/061
Superfund Record of Decision (EPA Region 4): Schuylkill Metal, Hillsborough County, Plant City, FL. (First Remedial Action), September 1990.
PB91-921501/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R04-90/062
Superfund Record of Decision (EPA Region 4): Munisport Landfill Site, Dade County, North Miami, FL. (First Remedial Action), July 1990.
PB91-921525/REB 91-04 PC **A09**/MF **A02**

EPA/ROD/R04-90/063
Superfund Record of Decision (EPA Region 4): Howe Valley Landfill, Howe Valley, KY. (First Remedial Action), September 1990.
PB91-921539/REB 91-04 PC **A11**/MF **A03**

EPA/ROD/R04-90/065
Superfund Record of Decision (EPA Region 4): Harris/Palm Bay Facility, Palm Bay, Brevard County, FL. (First Remedial Action), June 1990.
PB91-921442/REB 91-04 PC **A06**/MF **A01**

EPA/ROD/R04-90/066
Superfund Record of Decision (EPA Region 4): Coleman Evans Wood Preserving Site, Duval County, Jacksonville, Florida (First Remedial Action (Amendment)), Final Report, September 9, 1990.
PB91-921560/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R04-90/067
Superfund Record of Decision (EPA Region 4): Yellow Water Road Site, Duval County, Baldwin, FL. (First Remedial Action), September 1990.
PB91-921546/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R04-90/068
Superfund Record of Decision (EPA Region 4): North Hollywood Dump, TN. (First Remedial Action), September 1990.
PB91-921443/REB 91-04 PC **A13**/MF **A02**

EPA/ROD/R04-90/069
Superfund Record of Decision (EPA Region 4): Lewisburg Dump Site, Lewisburg, Marshall County, Tennessee (First Remedial Action), Final Report, September 19, 1990.
PB91-921561/REB 91-04 PC **A11**/MF **A03**

EPA/ROD/R04-90/070
Superfund Record of Decision (EPA Region 4): 62nd Street Dump, Hillsborough County, Tampa, FL. (First Remedial Action), June 1990.
PB91-921507/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R04-90/071
Superfund Record of Decision (EPA Region 4): Dubose Oil Products Site, Cantonment, Escambia County, FL. (First Remedial Action), March 1990.
PB91-921444/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R04-90/072
Superfund Record of Decision (EPA Region 4): Kassouf-Kimerling Battery Site, Tampa, Hillsborough County, FL. (Second Remedial Action), March 1990.
PB91-921445/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R04-90/073
Superfund Record of Decision (EPA Region 4): National Starch and Chemical Corporation Site, Salisbury, NC. (Second Remedial Action), September 1990.
PB91-921446/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R04-90/074
Superfund Record of Decision (EPA Region 4): SCRDI Bluff Road Site, Columbia, Richland County, SC. (First Remedial Action), September 1990.
PB91-921447/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R04-90/075
Superfund Record of Decision (EPA Region 4): Pickettville Road Landfill, Jacksonville, Duval County, FL. (First Remedial Action), September 1990.
PB91-921448/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R04-90/076
Superfund Record of Decision (EPA Region 4): Zellwood Groundwater Contamination Site, (Operable Unit 1), Orange County, Zellwood, FL. (First Remedial Action), (Amendment), March 1990.
PB91-921508/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R04-90/077
Superfund Record of Decision (EPA Region 4): Cabot Carbon/Koppers Site, Gainesville, Alachua County, FL. (First Remedial Action), September 1990.
PB91-921449/REB 91-04 PC **A07**/MF **A01**

EPA/ROD/R04-90/078
Superfund Record of Decision (EPA Region 4): Bypass 601 Groundwater Contamination Site (Martin Scrap Recycling Facility), Concord, NC. (First Remedial Action), August 1990.
PB91-921531/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/121
Superfund Record of Decision (EPA Region 5): NL Industries/Taracorp Lead Smelting, Granite City, IL. (First Remedial Action), March 1990.
PB91-921515/REB 91-04 PC **A09**/MF **A03**

EPA/ROD/R05-90/122
Superfund Record of Decision (EPA Region 5): Tri-State Plating, Columbus, IN. (First Remedial Action), March 1990.
PB91-921450/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R05-90/123
Superfund Record of Decision (EPA Region 5): Wayne Reclamation and Recycling, Columbia City, Indiana (First Remedial Action), Final Report, March 30, 1990.
PB91-921552/REB 91-04 PC **A05**/MF **A02**

EPA/ROD/R05-90/124
Superfund Record of Decision (EPA Region 5): Sangamo/Crab Orchard National Wildlife Refuge (USDOI), Carterville, IL. (First Remedial Action), August 1990.
PB91-921509/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R05-90/125
Superfund Record of Decision (EPA Region 5): Onalaska Municipal Landfill Site, Lacrosse County, Wisconsin (First Remedial Action), Final Report, August 14, 1990.
PB91-921410/REB 91-01 PC **A06**/MF **A01**

EPA/ROD/R05-90/126
Superfund Record of Decision (EPA Region 5): Spiegelberg Site, Green Oak Township, Livingston County, Michigan (First Remedial Action), Final Report, June 29, 1990.
PB91-921553/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/127
Superfund Record of Decision (EPA Region 5): Hagen Farm Site, Source Control Operable Unit, Dane County, WI. (First Remedial Action), September 1990.
PB91-921545/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R05-90/128
Superfund Record of Decision (EPA Region 5): Fisher-Calo Chem, Kingsbury, IN. (First Remedial Action), August 1990.
PB91-921451/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/129
Superfund Record of Decision (EPA Region 5): Oconomowoc Electroplating Company Site, Ashippun, WI. (First Remedial Action), September 1990.
PB91-921517/REB 91-04 PC **A05**/MF **A02**

EPA/ROD/R05-90/130
Superfund Record of Decision (EPA Region 5): Wheeler Pit Site, La Prairie Township, WI. (First Remedial Action), September 1990.
PB91-921452/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/132
Superfund Record of Decision (EPA Region 5): Pristine, Inc., Reading, OH. (First Remedial Action), March 1990. (Amendment).
PB91-921453/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R05-90/133
Superfund Record of Decision (EPA Region 5): K and L Landfill, Kalamazoo, MI. (First Remedial Action), September 1990.
PB91-921454/REB 91-04 PC **A02**/MF **A01**

EPA/ROD/R05-90/134
Superfund Record of Decision (EPA Region 5): Kummer Sanitary Landfill, Northern Township, Beltrami County, MN. (Third Remedial Action), September 1990.
PB91-921547/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/135
Superfund Record of Decision (EPA Region 5): Ott/Story/Cordova Chemical Site, North Muskegon, MI. (Second Remedial Action), September 1990.
PB91-921455/REB 91-04 PC **A05**/MF **A02**

EPA/ROD/R05-90/136
Superfund Record of Decision (EPA Region 5): Naval Industrial Reserve Ordnance Plant, Fridley, MN. (First Remedial Action), September 1990.
PB91-921456/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/137
Superfund Record of Decision (EPA Region 5): Anderson Development Company Site, Adrian, Michigan (First Remedial Action), Final Report, September 28, 1990.
PB91-921562/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/138
Superfund Record of Decision (EPA Region 5): National Presto Industries, Eau Claire, WI. (First Remedial Action), August 1990.
PB91-921457/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/139
Superfund Record of Decision (EPA Region 5): St. Louis River/Interlake/Duluth Tar Site, Duluth, MN. (First Remedial Action), September 1990.
PB91-921458/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/140
Superfund Record of Decision (EPA Region 5): Clare Water Supply, Clare County, MI. (First Remedial Action), August 1990.
PB91-921459/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R05-90/141
Superfund Record of Decision (EPA Region 5): University of Minnesota Rosemount Research Center, MN. (First Remedial Action), June 1990.
PB91-921460/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R05-90/142
Superfund Record of Decision (EPA Region 5): Moss-American Kerr-McGee Oil Site, Milwaukee, WI. (First Remedial Action), September 1990.
PB91-921461/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R05-90/143
Superfund Record of Decision (EPA Region 5): Springfield Township Dump Site, Oakland County, MI. (First Remedial Action), September 1990.
PB91-921462/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R05-90/144
Superfund Record of Decision (EPA Region 5): Metamora Landfill, Metamora, Lapeer County, MI. (Second Remedial Action), September 1990.
PB91-921463/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/145
Superfund Record of Decision (EPA Region 5): Algoma Municipal Landfill, Algoma, WI. (First Remedial Action), September 1990.
PB91-921518/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/146
Superfund Record of Decision (EPA Region 5): Master Disposal Service Landfill, Brookfield, WI. (First Remedial Action), September 1990.
PB91-921524/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/147
Superfund Record of Decision (EPA Region 5): Reilly Tar and Chemical Corporation Site, St. Peter Aquifer, St. Louis Park, MN. (Third Remedial Action), September 1990.
PB91-921519/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/148
Superfund Record of Decision (EPA Region 5): Hunts Disposal Landfill Site, Town of Caledonia, WI. (First Remedial Action), September 1990.
PB91-921464/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/149
Superfund Record of Decision (EPA Region 5): Union Scrap Iron Metal, Hennepin County, Minneapolis, MN. (First Remedial Action), March 1990.
PB91-921465/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R05-90/150
Superfund Record of Decision (EPA Region 5): Bofors-Nobel Site, Muskegon, MI. (First Remedial Action), September 1990.
PB91-921466/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/055
Superfund Record of Decision (EPA Region 6): Jacksonville Municipal Landfill Superfund Site, AR. (First Remedial Action), September 1990.
PB91-921467/REB 91-04 PC **A09**/MF **A02**

EPA/ROD/R06-90/056
Superfund Record of Decision (EPA Region 6): Vertac, Inc., Jacksonville, AR. (First Remedial Action), September 1990.
PB91-921513/REB 91-04 PC **A09**/MF **A02**

EPA/ROD/R06-90/057
Superfund Record of Decision (EPA Region 6): Texarkana Wood Preserving Company, Texarkana, Bowie County, TX. (First Remedial Action), September 1990.
PB91-921468/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/058
Superfund Record of Decision (EPA Region 6): Pagano Salvage Site, Los Lunas, NM. (First Remedial Action), September 1990.
PB91-921520/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R06-90/059
Superfund Record of Decision (EPA Region 6): Tenth Street Dump/Junkyard, Oklahoma City, OK. (First Remedial Action), September 1990.
PB91-921469/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/060
Superfund Record of Decision (EPA Region 6): Cimarron Mining Corporation Site, Operable Unit 1, Lincoln County, Carrizozo, NM. (First Remedial Action), September 1990.
PB91-921543/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/061
Superfund Record of Decision (EPA Region 6): Tinker AFB (Soldier Creek/Bldg. 3001), OK. (First Remedial Action), August 1990.
PB91-921470/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R06-90/062
Superfund Record of Decision (EPA Region 6): Crystal Chemical Site, Houston, TX. (First Remedial Action), September 1990.
PB91-921510/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R06-90/063
Superfund Record of Decision (EPA Region 6): Rogers Road Municipal Landfill, Pulaski County, Arkansas (First Remedial Action), Final Report, September 27, 1990.
PB91-921563/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R06-90/064
Superfund Record of Decision (EPA Region 6): Arkwood, Inc., Omaha, AR. (First Remedial Action), September 1990.
PB91-921521/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R07-90/033
Superfund Record of Decision (EPA Region 7): Northwestern States Portland Cement Company Site, Mason City, IA. (First Remedial Action), June 1990.
PB91-921471/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/034
Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination (East Industrial Park), NE (First Remedial Action), September 1990.
PB91-921472/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R07-90/035
Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination FAR-MAR-CO Subsite, Hastings Irrigation Pipe Company TCA Soils Operable Unit, Hastings, NE. (Second Remedial Action), September 1990.
PB91-921473/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/036
Superfund Record of Decision (EPA Region 7): Lindsay Manufacturing Company, Lindsay, NE. (First Remedial Action), September 1990.
PB91-921474/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R07-90/037
Superfund Record of Decision (EPA Region 7): Midwest Manufacturing/North Farm Site, Midwest Operable Unit, Kellogg, IA. (First Remedial Action), September 1990.
PB91-921475/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R07-90/038
Superfund Record of Decision (EPA Region 7): Missouri Electric Works Site, Cape Girardeau, MO. (First Remedial Action), September 1990.
PB91-921476/REB 91-04 PC **A05**/MF **A02**

EPA/ROD/R07-90/039
Superfund Record of Decision (EPA Region 7): Waverly Ground Water Contamination Site, Waverly, NE. (First Remedial Action), September 1990.
PB91-921477/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/040
Superfund Record of Decision (EPA Region 7): White Farm Equipment Company Dump Site, Floyd County, Charles City, IA. (First Remedial Action), September 1990.
PB91-921514/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R07-90/041
Superfund Record of Decision (EPA Region 7): Fairfield Coal Gasification Site, Fairfield, IA. (First Remedial Action), September 1990.
PB91-921478/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R07-90/042
Superfund Record of Decision (EPA Region 7): Shenandoah Stables, Lincoln County, MO. (Second Remedial Action), September 1990.
PB91-921541/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/043
Superfund Record of Decision (EPA Region 7): Weldon Spring Quarry/Plant/Pits (USDOE), Weldon Spring, MO. (Second Remedial Action), September 1990.
PB91-921564/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R07-90/044
Superfund Record of Decision (EPA Region 7): Wheeling Disposal Service Company Landfill, Amazonia, MO. (First Remedial Action), September 1990.
PB91-921532/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/028
Superfund Record of Decision (EPA Region 8): Whitewood Creek Site, Lawrence, Meade, and Butte Counties, South Dakota (First Remedial Action), Final Report, March 30, 1990.
PB91-921409/REB 91-01 PC **A05**/MF **A01**

EPA/ROD/R08-90/029
Superfund Record of Decision (EPA Region 8): Portland Cement Co. (Kiln Dust No. 2 and No. 3) Operable Unit 1, Salt Lake City, UT. (First Remedial Action), September 1990.
PB91-921540/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R08-90/030
Superfund Record of Decision (EPA Region 8): Silver Bow Creek/Butte Area NPL Site, Warm Springs Ponds Operable Unit, Upper Clark Fork River Basin, MT. (First Remedial Action), September 1990.
PB91-921528/REB 91-04 PC **A20**/MF **A04**

EPA/ROD/R08-90/031
Superfund Record of Decision (EPA Region 8): Sand Creek Industrial Site, Commerce City, CO. (Second Remedial Action), September 1990.
PB91-921479/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/032
Superfund Record of Decision (EPA Region 8): Ogden Defense Depot (Operable Unit 2), Weber County, Ogden, UT. (First Remedial Action), September 1990.
PB91-921480/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R08-90/033
Superfund Record of Decision (EPA Region 8): Mystery Bridge at Highway 20, Natrona County, WY. (First Remedial Action), September 1990.
PB91-921481/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R08-90/034
Superfund Record of Decision (EPA Region 8): Monticello Mill Tailings Site, San Juan County, UT. (First Remedial Action), August 1990.
PB91-921482/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/035
Superfund Record of Decision (EPA Region 8): Martin Marietta Astronautics Group Site, Waterton, CO. (First Remedial Action), September 1990.
PB91-921483/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R08-90/036
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 16), CO. (Second Remedial Action), February 1990.
PB91-921484/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R08-90/037
Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 17), CO. (Eighth Remedial Action), February 1990.
PB91-921512/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/038
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 18), CO. (Third Remedial Action), February 1990.
PB91-921485/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/039
Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 19), CO. (Fourth Remedial Action), February 1990.
PB91-921511/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R08-90/040
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 20), CO. (Fifth Remedial Action), March 1990.
PB91-921486/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R08-90/041
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 22), Colorado (Sixth Remedial Action), Final Report, May 3, 1990.
PB91-921554/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/042
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 23), Adams County, Colorado (Seventh Remedial Action), Final Draft, March 1990.
PB91-921555/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/043
Superfund Record of Decision (EPA Region 8): Rocky Flats Plant (DOE), Northern Jefferson County, CO. (First Remedial Action), January 1990.
PB91-921487/REB 91-04 PC **A19**/MF **A04**

EPA/ROD/R08-90/044
Superfund Record of Decision (EPA Region 8): Sharon Steel (Midvale Tailings), Midvale, UT. (First Remedial Action), September 1990.
PB91-921488/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R09-89/038
Superfund Record of Decision (EPA Region 9): Coast Wood Preserving, Inc., Ukiah, CA. (First Remedial Action, September 1989).
PB91-921415/REB 91-01 PC **A15**/MF **A02**

EPA/ROD/R09-90/046
Superfund Record of Decision (EPA Region 9): Watkins-Johnson (Stewart Division), Scotts Valley, California (First Remedial Action), Final Report, June 29, 1990.
PB91-921411/REB 91-01 PC **A03**/MF **A01**

EPA/ROD/R09-90/047
Superfund Record of Decision (EPA Region 9): J. H. Baxter Superfund Site, Weed, CA. (First Remedial Action), September 1990.
PB91-921489/REB 91-04 PC **A10**/MF **A03**

EPA/ROD/R09-90/048
Superfund Record of Decision (EPA Region 9): Stringfellow Hazardous Waste Site, Riverside County, CA. (Fourth Remedial Action), September 1990.
PB91-921490/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R09-90/049
Superfund Record of Decision (EPA Region 9): Coalinga Asbestos Mine, Fresno County, CA. (Second Remedial Action), September 1990.
PB91-921523/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R09-90/050
Superfund Record of Decision (EPA Region 9): Solvent Service Superfund Site, San Jose, CA. (First Remedial Action), September 1990.
PB91-921544/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R09-90/052
Superfund Record of Decision (EPA Region 9): Intersil/Siemens Superfund Site, Cupertino, CA. (First Remedial Action), September 1990.
PB91-921535/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R09-90/053
Superfund Record of Decision (EPA Region 9): Louisiana-Pacific Corporation, Oroville, CA. (First Remedial Action), September 1990.
PB91-921491/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R09-90/054
Superfund Record of Decision (EPA Region 9): Applied Materials, Inc., Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921492/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R09-90/055
Superfund Record of Decision (EPA Region 9): Operating Industries, Inc., Monterey Park, CA. (Third Remedial Action), September 1990 (Amendment).
PB91-921493/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R09-90/055
Superfund Record of Decision (EPA Region 9): Intel Santa Clara III Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921534/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R10-90/021
Superfund Record of Decision (EPA Region 10): Teledyne Wah Chang, Albany, OR. (First Remedial Action), December 1989.
PB91-921414/REB 91-01 PC **A04**/MF **A01**

EPA/ROD/R10-90/024
Superfund Record of Decision (EPA Region 10): FMC Pesticide Formulation Facility, Yakima, WA. (First Remedial Action), September 1990.
PB91-921494/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R10-90/025
Superfund Record of Decision (EPA Region 10): Fort Lewis Logistics Center, Pierce County, Fort Lewis, WA. (First Remedial Action), September 1990.
PB91-921542/REB 91-04 PC **A04**/MF **A01**

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New Source Identification of Mercury Contamination in the Great Lakes.
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Extraction and Concentration of Nonpolar Organic Toxicants from Effluents Using Solid Phase Extraction.
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Piperonyl Butoxide as a Tool in Aquatic Toxicological Research with Organophosphate Insecticides.
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Ocular Chondrosarcomas in 'Rivulus marmoratus' Poey (Short Communication).
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Testing of Insect Microsporidians (Microspora: Nosematidae) in Nontarget Aquatic Species.
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Morphological and Behavioral Characters in Mosquitofish as Potential Bioindication of Exposure to Kraft Mill Effluent.
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Genes Encoding Mercuric Reductases from Selected Gram-Negative Aquatic Bacteria Have a Low Degree of Homology with merA of Transposon TN50.
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Comparison of the Seagrass 'Thalassia testudinum' and Its Epiphytes in the Field and in Laboratory Test Systems.
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Pericyte of a Teleost Fish: Ultrastructure, Position, and Role in Neoplasia as Revealed by a Fish Model.
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Field Observations of the Ecology and Habits of Mangrove Rivulus ('Rivulus marmoratus') in Belize and Florida (Teleostei: Cyprinodontiformes: Rivulidae).
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EPA/600/J-90/373
Bioaccumulation of Kepone by Grass Shrimp ('Palaemonetes pugio'): Importance of Dietary Accumulation and Food Ration.
PB91-163865/REB 91-01 PC **A03**/MF **A01**

EPA/600/J-90/375
Effects of Temperature and Salinity on 'Menidia beryllina' Embryos Exposed to Terbufos.
PB91-163881/REB 91-01 PC **A03**/MF **A01**

EPA/600/J-90/376
Testing of Insect Microsporidians (Microspora: Nosematidae) in Nontarget Aquatic Species.
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Natural Transformation of a Marine 'Vibrio' Species by Plasmid DNA.
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Use of 'Thalassia' and Its Epiphytes for Toxicity Assessment: Effects of a Drilling Fluid and Tributyltin.
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Alterations in the Energy Metabolism of an Estuarine Mysid 'Mysidopsis bahia' as Indicators of Stress from Chronic Pesticide Exposure.
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Genetic Variation in Clonal Vertebrates Detected by Simple-Sequence DNA Fingerprinting.
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Hepatic Neoplasms in the Mummichog 'Fundulus heteroclitus' from a Creosote-Contaminated Site.
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Anatomy of the Seed and Seedling of 'Spartina alterniflora' Lois. (Poaceae).
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Artificial Sediments for Use in Tests with Wetland Plants.
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Anomalies in the Enumeration of Starved Bacteria on Culture Media Containing Nalidixic Acid and Tetracycline.
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Toxicity Tests of Effluents with Marsh Plants in Water and Sediment.
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Ocular Chondrosarcomas in 'Rivulus marmoratus' Poey (Short Communication).
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Contaminant Loading from Fox River to Lower Green Bay.
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Lack of Myoglobin Function in the Isolated Perfused Buffalo Sculpin('Enophrys bison') Heart.
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Taxonomic Level and Sample Size Sufficient for Assessing Pollution Impacts on the Southern California Bight Macrobenthos.
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Increasing Sensitivity of the Ortho Analytical Cytofluorograph by Modifying the Fluid System.
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Validation of Protocols for Assessing Early Pregnancy Failure in the Rat: Clomiphene Citrate.
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Symposium Overview: Symposium on Application of Pharmacokinetics in Developmental Toxicity Risk Assessments.
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Biochemical Studies of Promoters of Carcinogenesis in Rat Liver.
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EPA/600/J-90/126
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PB91-109652/REB 91-01 PC **A02**/MF **A01**

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PB91-149740/REB 91-01 PC **A03**/MF **A01**

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Immune Alterations in Rats Following Subacute Exposure to Tributyltin Oxide.
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PB91-171819/REB 91-01 PC **A03**/MF **A01**

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Is 1,4-Dioxane a Genotoxic Carcinogen.
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Development of Surrogate Lung Systems with Controlled Thermodynamic Environments to Study Hygroscopic Particles: Air Pollutants and Pharmacologic Drugs.
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Critical Review of the Developmental Toxicity and Teratogenicity of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin: Recent Advances Toward Understanding the Mechanism.
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PB91-200279/REB 91-01 PC **A03**/MF **A01**

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PB91-211441/REB 91-04 PC **A03**/MF **A01**

EPA/600/J-91/123
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PB91-211466/REB 91-04 PC **A03**/MF **A01**

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EPA/600/D-90/246
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PB91-162602/REB 91-01 PC **A03**/MF **A01**

EPA/600/D-91/135
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PB91-219139/REB 91-04 PC **A03**/MF **A01**

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PB91-242453/REB 91-04 PC **A03**/MF **A01**

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Differences in Detection of DNA Adducts in the 32P-Postlabelling Assay After Either 1-Butanol Extraction or Nuclease P1 Treatment.
PB91-115972/REB 91-01 PC **A02**/MF **A01**

EPA/600/J-90/095
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PB91-171777/REB 91-01 PC **A02**/MF **A01**

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Further Evidence That Dichloromethane Does Not Induce Chromosome Damage.
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Genetic Activity Profiles in the Testing and Evaluation of Chemical Mixtures, June 1990.
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Multiple DNA Adducts in Lymphocytes of Smokers and Nonsmokers Determined by 32P-Postlabeling Analysis.
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Genotoxicity of Inhibitors of DNA Topoisomerases I (Camptothecin) and II (m-AMSA) In vivo and In vitro.
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Persistence of Lymphocytes with Dicentric Chromosomes Following Whole-Body X Irradiation of Mice.
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Non-Random Cell Killing in Cryopreservation: Implications for Performance of the Battery of Leukocyte Tests (BLT), 1. Toxic and Immunotoxic Effects.
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Development of the U.S. EPA Health Effects Research Laboratory Frozen Blood Cell Repository Program.
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PB91-200329/REB 91-01 PC **A03**/MF **A01**

EPA/600/J-91/162
Relative Sensitivity of (32)P-postlabelling of DNA and the Autoradiographic UDS Assay in the Liver of Mice Exposed to 2-acetylaminofluorene (2AAF).
PB91-231308/REB 91-04 PC **A03**/MF **A01**

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Relative Sensitivity of (32)P-postlabelling of DNA and the Autoradiographic UDS Assay in the Liver of Rats Exposed to 2-acetylaminofluorene (2AAF).
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Compatibility of Organic Solvents with the Microscreen Prophage-Induction Assay: Solvent - Mutagen Interactions.
PB91-231324/REB 91-04 PC **A02**/MF **A01**

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Formation of Mutagenic Urinary Metabolites from 1-Nitropyrene in Germ-Free and Conventional Rats: Role of the Gut Flora.
PB91-243055/REB 91-04 PC **A02**/MF **A01**

HEALTH EFFECTS RESEARCH LAB., RESEARCH TRIANGLE PARK, NC. HUMAN STUDIES DIV.

EPA/600/D-91/218
Assessment of Neurobehavioral Response in Humans to Low-Level Volatile Organic Compound (VOC) Sources.
PB91-233353/REB 91-04 PC **A03**/MF **A01**

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Respiratory Tract Dosimetry Model for Air Toxics (October 1990).
PB91-163709/REB 91-01 PC **A03**/MF **A01**

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U.S. Environmental Protection Agency's Inhalation RFD Methodology: Risk Assessment for Air Toxics.
PB91-163717/REB 91-01 PC **A03**/MF **A01**

HEALTH EFFECTS RESEARCH LAB., RESEARCH TRIANGLE PARK, NC. NEUROTOXICOLOGY DIV.

EPA/600/D-91/047
Use of Cell Culture for Evaluating Neurotoxicity.
PB91-176990/REB 91-01 PC **A04**/MF **A01**

EPA/600/D-91/116
Comparison of Screening Approaches.
PB91-199851/REB 91-01 PC **A03**/MF **A01**

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Assessment of Neurotoxicity Using Assays of Neuron- and Glia- Localized Proteins: Chronology and Critique.
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Enhanced Expression of Glial Fibrillary Acidic Protein and the Cupric Silver Degeneration Reaction Can Be Used as Sensitive and Early Indicators of Neurotoxicity.
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Caveats in Hazard Assessment: Stress and Neurotoxicity.
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Investigations of Amitraz Neurotoxicity in Rats. 3. Effects on Motor Activity and Inhibition of Monoamine Oxidase.
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Acute Effects of Amitraz on the Acoustic Startle Response and Motor Activity.
PB91-115998/REB 91-01 PC **A03**/MF **A01**

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Neurotoxicity of Subchronic Acetylcholinesterase (AChE): Inhibition in Rat Hippocampus.
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Stationary Pattern Adaptation and the Early Components in Human Visual Evoked Potentials.
PB91-109686/REB 91-01 PC **A03**/MF **A01**

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Examination of the Proconvulsant Actions of Pyrethroid Insecticides Using Pentylenetetrazol and Amygdala Kindling Seizure Models.
PB91-109744/REB 91-01 PC **A03**/MF **A01**

EPA/600/J-90/167
Neurotoxicology in the 1990s.
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Neurotoxicity of Subchronic Acetylcholinesterase (AChE) Inhibition in Rat Hippocampus.
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EPA/600/J-90/235
Reflex Modification and the Detection of Toxicant-Induced Auditory Dysfunction.
PB91-117036/REB 91-01 PC **A02**/MF **A01**

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Trimethyltin Effects on Auditory Function and Cochlear Morphology.
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Thermoregulation at a High Ambient Temperature Following the Oral Administration of Ethanol in the Rat.
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Evidence for an Involvement of Associative Conditioning in Reflex Modification of the Acoustic Startle Response with Gaps in Background Noise.
PB91-163634/REB 91-01 PC **A02**/MF **A01**

EPA/600/J-90/350
Modelling Working and Reference Memory in Rats: Effects of Scopolamine on Delayed Matching-to-Position.
PB91-163642/REB 91-01 PC **A03**/MF **A01**

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Acute Exposure to Tris(2-Chloroethyl)Phosphate Produces Hippocampal Neuronal Loss and Impairs Learning in Rats.
PB91-171728/REB 91-01 PC **A03**/MF **A01**

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Delay-Dependent Impairment of Reversal Learning in Rats Treated with Trimethyltin.
PB91-171793/REB 91-01 PC **A03**/MF **A01**

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Potentiation of Organophosphorus-Induced Delayed Neurotoxicity by Phenylmethylsulfonyl Fluoride.
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Systemic Administration of Kainic Acid Increases GABA Levels in Perfusate from the Hippocampus of Rats 'In vivo'.
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Hypothermic Effects of a Homologous Series of Short-Chain Alcohols in Rats.
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Glutamate Neruotoxicity in the Developing Rat Cochlea: Physiological and Morphological Approaches.
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Comparability of Rat and Human Visual-Evoked Potentials.
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Effects of 2,4-Dithiobiuret on Sensory and Motor Function.
PB91-200220/REB 91-01 PC **A03**/MF **A01**

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Behavioral and Neurochemical Changes in Rats Dosed Repeatedly with Diisopropylfluorophosphate.
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EPA/600/J-91/132
Nuclear and Axonal Localization of Ca(2+)/Calmodulin-Dependent Protein Kinase Type Gr in Rat Cerebellar Cortex.
PB91-213637/REB 91-04 PC **A02**/MF **A01**

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Acquisition and Loss of a Neuronal Ca(2+)/Calmodulin-Dependent Protein Kinase during Neuronal Differentiation.
PB91-213652/REB 91-04 PC **A02**/MF **A01**

EPA/600/J-91/211
Pargyline and gamma-Butyrolactone Enhance Tyrosine Hydroxylase Immunostaining of Nigrostriatal Axons.
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Structure-Activity Relationships in the Developmental Toxicity of Substituted Phenols: In vivo Effects.
PB91-115907/REB 91-01 PC **A03**/MF **A01**

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Physiological Consequences of Early Neonatal Growth Retardation: Effects of alpha-Difluoromethylornithine on Renal Growth and Function in the Rat.
PB91-183517/REB 91-01 PC **A02**/MF **A01**

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EPA/600/D-90/247
In vitro Assessment of Gamete Integrity.
PB91-162610/REB 91-01 PC **A03**/MF **A01**

EPA/600/J-90/287
Development of Chicken Embryos in a Pulsed Magnetic Field.
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Effect of Acute Exposure to Boric Acid on the Male Reproductive System of the Rat.
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Importance of Glycolysable Substrates for In vitro Capacitation of Human Spermatozoa.
PB91-163725/REB 91-01 PC **A02**/MF **A01**

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Effect of Cadmium and Other Metal Cations on In vitro Leydig Cell Testosterone Production.
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Method of Sperm Collection Significantly Influences Sperm Motion Parameters Following Ethane Dimethanesulphonate Administration in the Rat.
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Aerosol Characterization with Centrifugal Aerosol Spectrometers: Theory and Experiment.
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Standard Test Procedures for Evaluating Leak Detection Methods: Pipeline Leak Detection Systems.
(EPA/530/UST-90/010)
PB91-113860/REB 91-01 PC **A08**/MF **A01**

MIDWEST RESEARCH INST., KANSAS CITY, MO.
Brominated Dioxins and Dibenzofurans in Human Adipose Tissue.
(EPA/560/5-90/005)
PB91-103507/REB 91-01 PC **A04**/MF **A01**

Technical Evaluation of the Combustion System of the Marine Shale Processors, Inc. Facility in Amelia, Louisiana.
(EPA/530/SW-90/086)
PB91-111492/REB 91-01 PC **A03**/MF **A01**

Field Measurements: Dependable Data When You Need It.
(EPA/530/UST-90/003)
PB91-129825/REB 91-01 PC **A05**/MF **A01**

Mass Spectral Confirmation of Chlorinated and Brominated Diphenylethers in Human Adipose Tissues.
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PB91-159699/REB 91-01 PC **A04**/MF **A01**

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(EPA/530/SW-91/004)
PB91-101865/REB 91-01 PC **A09**/MF **A01**

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PB91-142885/REB 91-01 PC **A07**

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PB91-143446/REB 91-01 PC **A09**/MF **A01**

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(EPA/600/J-90/251)
PB91-144949/REB 91-01 PC **A02**/MF **A01**

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PB91-144931/REB 91-01 PC **A02**/MF **A01**

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Methodology Used for a Laboratory Determination of Relative Contributions of Water, Sediment and Food Chain Routes of Uptake for 2,3,7,8-TCDD Bioaccumulation by Lake Trout in Lake Ontario.
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PB91-144782/REB 91-01 PC **A02**/MF **A01**

Partitioning Studies of Dioxin between Sediment and Water: The Measurement of Koc for Lake Ontario Sediment.
(EPA/600/J-89/502)
PB91-146415/REB 91-01 PC **A02**/MF **A01**

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(EPA/600/J-91/201)
PB91-242602/REB 91-04 PC **A02**/MF **A01**

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PB91-146407/REB 91-01 PC **A02**/MF **A01**

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Carbon Tetrachloride Metabolism in Partially Hepatectomized and Sham-Operated Rats Pre-Exposed to Chlordecone (Kepone).
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PB91-109553/REB 91-01 PC **A03**/MF **A01**

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PB91-191593/REB 91-01 PC **A03**/MF **A01**

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CCMS-172
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(EPA/600/6-90/013)
PB91-103598/REB 91-01 PC **A10**/MF **A02**

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PB91-125666/REB 91-01 PC **A03**/MF **A01**

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(EPA/600/J-91/014)
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PB91-116913/REB 91-01 PC **A02**/MF **A01**

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Field Comparison of Ground-Water Sampling Devices for Hazardous Waste Sites: An Evaluation Using Volatile Organic Compounds.
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PB91-181776/REB 91-01 PC **A06**/MF **A01**

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Sources of Error in Analysis of Municipal Sludges and Sludge-Amended-Soils for Di(2-ethylhexyl) Phthalate.
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(EPA/600/J-90/449)
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(EPA/600/J-90/450)
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Questionnaire Assessment of Lifetime and Recent Exposure to Environmental Tobacco Smoke.
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PB91-206961/REB 91-04 PC **A02**/MF **A01**

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PB91-109173/REB 91-01 PC **A03**/MF **A01**

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Adequacy of Interval Estimates of Yield Responses to Ozone Estimated from NCLAN Data.
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PB91-144832/REB 91-01 PC **A03**/MF **A01**

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Estradiol Alters the Effectiveness of Gonadotropin-Releasing Hormone (GnRH) in Ovine Pituitary Cultures: GnRH Receptors versus Responsiveness to GnRH.
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PB91-171850/REB 91-01 PC **A03**/MF **A01**

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(EPA/600/J-91/047)
PB91-191544/REB 91-01 PC **A03**/MF **A01**

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PB91-176982/REB 91-01 PC **A03**/MF **A01**

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(EPA/600/J-91/007)
PB91-177352/REB 91-01 PC **A03**/MF **A01**

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(EPA/600/J-91/206)
PB91-242982/REB 91-04 PC **A03**/MF **A01**

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Temperature Scenario Development Using Regression Methods. Phase 2.
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PB91-231506/REB 91-04 PC **A04**/MF **A01**

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(EPA/600/J-91/185)
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(EPA/450/2-81/005)
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PB91-109124/REB 91-01 PC **A03**/MF **A01**

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PB91-109140/REB 91-01 PC **A02**/MF **A01**

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(EPA/600/J-90/347)
PB91-163618/REB 91-01 PC **A03**/MF **A01**

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(EPA/600/J-88/543)
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PB91-109132/REB 91-01 PC **A02**/MF **A01**

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(EPA/600/J-88/539)
PB91-109207/REB 91-01 PC **A03**/MF **A01**

Increase in Angiotensin-Converting Enzyme in Rat Lungs Following Inhalation of Phosgene.
(EPA/600/J-89/463)
PB91-109546/REB 91-01 PC **A02**/MF **A01**

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PB91-242545/REB 91-04 PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
PB91-117630/REB 91-01 PC **A03**/MF **A01**

DE-AI01-89CE34024
Health Effects Research Lab., Research Triangle Park, NC.
PB91-211433/REB 91-04 PC **A03**/MF **A01**
PB91-242461/REB 91-04 PC **A02**/MF **A01**

DE-FG02-86ER60413
Massachusetts Inst. of Tech., Cambridge. Ralph M. Parsons Lab.
PB91-117457/REB 91-01 PC **A03**/MF **A01**

DE-FG05-88ER60654
Duke Univ. Medical Center, Durham, NC.
PB91-133033/REB 91-01 PC **A03**/MF **A01**

DE-1824-B124-A1
Lockheed Engineering and Sciences Co., Inc., Las Vegas, NV.
PB91-195990/REB 91-01 PC **A06**/MF **A01**

DOE-DW89934110-0
Battelle Pacific Northwest Labs., Richland, WA.
PB91-216523/REB 91-04 PC **A08**/MF **A02**

EPA-CE-006551
Galveston Bay National Estuary Program., Austin, TX.
PB91-230151/REB 91-04 PC **A06**/MF **A02**

EPA-CT-901659-1-0
Sumter Area Technical Coll., SC. Environmental Training Center.
PB91-201467/REB 91-04 PC **A08**/MF **A01**
PB91-206177/REB 91-04 PC **A04**/MF **A01**

EPA-DW12931230
Forest Service, Washington, DC.
PB91-137109/REB 91-01 PC **A03**/MF **A01**

EPA-DW-89932918-01
Oak Ridge National Lab., TN.
PB91-102327/REB 91-01 PC **A05**/MF **A01**

EPA-R81-3853-02-1
National Governors' Association, Washington, DC.
PB91-219105/REB 91-04 PC **A03**/MF **A01**

EPA-R81-4169-03
Research Triangle Inst., Research Triangle Park, NC.
PB91-191171/REB 91-01 PC **A02**/MF **A01**

EPA-R81-14965
Drexel Univ., Philadelphia, PA. Geosynthetic Research Inst.
PB91-213660/REB 91-04 PC **A08**/MF **A02**

EPA-R-814-017-01-0
Maryland Univ., College Park. Dept. of Botany.
PB91-146381/REB 91-01 PC **A02**/MF **A01**

EPA-R-005774
Ohio State Univ., Columbus.
PB91-233601/REB 91-04 PC **A05**/MF **A01**

EPA-R81499
Stanford Univ., CA. Dept. of Applied Earth Sciences.
PB91-163733/REB 91-01 PC **A03**/MF **A01**

EPA-R-808642-01
Lawrence Livermore National Lab., CA. Biomedical Sciences Div.
PB91-145029/REB 91-01 PC **A03**/MF **A01**

EPA-R-809484
National Fisheries Contaminant Research Center, La Crosse, WI. Field Research Station.
PB91-196345/REB 91-01 PC **A02**/MF **A01**

EPA-R-809935-01
Florida International Univ., Miami. Drinking Water Research Center.
PB91-211367/REB 91-04 PC **A03**/MF **A01**

EPA-R-810230-01
Washington State Univ., Pullman. Lab. for Atmospheric Research.
PB91-183269/REB 91-01 PC **A03**/MF **A01**

EPA-R-810277-01
Florida International Univ., Miami. Drinking Water Research Center.
PB91-211367/REB 91-04 PC **A03**/MF **A01**

EPA-R-810341
James N. Gamble Inst. of Medical Research, Cincinnati, OH.
PB91-117622/REB 91-01 PC **A02**/MF **A01**

EPA-R-810775
Minnesota Univ., Minneapolis. Dept. of Ecology and Behavioral Biology.
PB91-146407/REB 91-01 PC **A02**/MF **A01**

EPA-R-811001
Utah Univ., Salt Lake City. Dept. of Chemical Engineering.
PB91-116871/REB 91-01 PC **A03**/MF **A01**
PB91-146670/REB 91-01 PC **A03**/MF **A01**
PB91-146688/REB 91-01 PC **A03**/MF **A01**

EPA-R-811335
American Water Works Association Research Foundation, Denver, CO.
PB91-211318/REB 91-04 PC **A03**/MF **A01**

EPA-R-811650
Harvard School of Public Health, Boston, MA. Dept. of Environmental Science and Physiology.
PB91-109462/REB 91-01 PC **A02**/MF **A01**
New Mexico Univ., Albuquerque. Medical Center.
PB91-109454/REB 91-01 PC **A03**/MF **A01**
New York Univ. Medical Center, Tuxedo Park. Inst. of Environmental Medicine.
PB91-109405/REB 91-01 PC **A02**/MF **A01**

EPA-R-811817
Battelle Columbus Labs., OH.
PB91-182212/REB 91-01 PC **A03**/MF **A01**

EPA-R-811819-02-0
Lawrence Livermore National Lab., CA. Biomedical Sciences Div.
PB91-145029/REB 91-01 PC **A03**/MF **A01**

EPA-R-812150-02-0
Maryland Univ., College Park. Dept. of Botany.
PB91-196295/REB 91-01 PC **A02**/MF **A01**

EPA-R-812182-01
Oregon State Univ., Corvallis. Dept. of Entomology.
PB91-240465/REB 91-04 PC **A03**/MF **A01**

EPA-R-812207
New Jersey Medical School, Newark.
PB91-109413/REB 91-01 PC **A02**/MF **A01**

EPA-R-812216-01
Wisconsin Univ.-Madison. Center for Limnology.
PB91-211417/REB 91-04 PC **A02**/MF **A01**

EPA-R-812220
RMT, Inc., Greenville, SC.
PB91-144774/REB 91-01 PC **A02**/MF **A01**

EPA-R-812279
Cincinnati Univ., OH. Dept. of Chemistry.
PB91-109603/REB 91-01 PC **A03**/MF **A01**
PB91-109777/REB 91-01 PC **A03**/MF **A01**

EPA-R-812281
Research Triangle Inst., Research Triangle Park, NC.
PB91-116863/REB 91-01 PC **A02**/MF **A01**

EPA-R-812466
Massachusetts Inst. of Tech., Cambridge. Ralph M. Parsons Lab.
PB91-117457/REB 91-01 PC **A03**/MF **A01**

EPA-R812483
Addis Ababa Univ. (Ethiopia). Dept. of Statistics.
PB91-231241/REB 91-04 PC **A03**/MF **A01**

EPA-R812496
Illinois Univ. at Urbana-Champaign. Dept. of Veterinary Pathobiology.
PB91-163857/REB 91-01 PC **A03**/MF **A01**

EPA-R812522
Research Triangle Inst., Research Triangle Park, NC.
PB91-177055/REB 91-01 PC **A02**/MF **A01**

EPA-R-812579
Cincinnati Univ., OH. Dept. of Chemistry.
PB91-116046/REB 91-01 PC **A03**/MF **A01**

EPA-R-812583
Arizona Univ., Tucson. Environmental Radioisotope Center.
PB91-191478/REB 91-01 PC **A02**/MF **A01**

EPA-R-812632-01
Washington State Univ., Pullman. Lab. for Atmospheric Research.
PB91-183269/REB 91-01 PC **A03**/MF **A01**

EPA-R812687-02
New Mexico State Univ., Las Cruces.
PB91-177139/REB 91-01 PC **A02**/MF **A01**

EPA-R-812713
Nevada Univ. System, Reno. Desert Research Inst.
PB91-146522/REB 91-01 PC **A03**/MF **A01**
PB91-146530/REB 91-01 PC **A03**/MF **A01**

EPA-R-812736
Wellcome Research Labs., Research Triangle Park, NC.
PB91-132969/REB 91-01 PC **A03**/MF **A01**

EPA-R-812738
North Carolina Univ. at Chapel Hill.
PB91-231084/REB 91-04 PC **A03**/MF **A01**
North Carolina Univ. at Chapel Hill. Center for Environmental Medicine and Lung Biology.
PB91-176982/REB 91-01 PC **A03**/MF **A01**

EPA-R-812765
Johns Hopkins Hospital, Baltimore, MD.
PB91-116996/REB 91-01 PC **A03**/MF **A01**

EPA-R-812774
Ohio State Univ., Columbus. Dept. of Microbiology.
PB91-242479/REB 91-04 PC **A02**/MF **A01**

EPA-R-812775
Washington State Univ., Pullman. Lab. for Atmospheric Research.
PB91-183244/REB 91-01 PC **A02**/MF **A01**

EPA-R-812781
New York Univ. Medical Center, NY. Inst. of Environmental Medicine.
PB91-109173/REB 91-01 PC **A03**/MF **A01**

EPA-R-812786
Texas Univ. at Austin. Bureau of Economic Geology.
PB91-144899/REB 91-01 PC **A03**/MF **A01**

EPA-R-812808
National Center for Ground Water Research, Houston, TX.
PB91-109959/REB 91-01 PC **A03**/MF **A01**
Oklahoma Univ., Norman. Dept. of Botany and Microbiology.
PB91-240549/REB 91-04 PC **A03**/MF **A01**

EPA-R-812939-01
Cincinnati Univ., OH. Dept. of Chemical Engineering.
PB91-191502/REB 91-01 PC **A03**/MF **A01**

EPA-R-812939-02
Cincinnati Univ., OH. Dept. of Chemical Engineering.
PB91-109868/REB 91-01 PC **A02**/MF **A01**

EPA-R-813008
Minnesota Univ., Minneapolis.
PB91-242602/REB 91-04 PC **A02**/MF **A01**

EPA-R-813088-01
Louisiana State Univ., Baton Rouge. Dept. of Microbiology.
PB91-177204/REB 91-01 PC **A02**/MF **A01**

EPA-R-813113
Duke Univ. Medical Center, Durham, NC.
PB91-117606/REB 91-01 PC **A02**/MF **A01**
PB91-133009/REB 91-01 PC **A03**/MF **A01**
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PB91-213538/REB 91-04 PC **A03**/MF **A01**
Duke Univ. Medical Center, Durham, NC. Center for Extrapolation Modelling.
PB91-132993/REB 91-01 PC **A03**/MF **A01**
Duke Univ. Medical Center, Durham, NC. Div. of Allergy, Critical Care, and Respiratory Medicine.
PB91-133017/REB 91-01 PC **A03**/MF **A01**

EPA-R-813138
South Carolina Univ., Columbia. Dept. of Environmental Health Sciences.
PB91-206839/REB 91-01 PC **A03**/MF **A01**

EPA-R813144-02
Minnesota Univ.-Duluth.
PB91-144949/REB 91-01 PC **A02**/MF **A01**
Minnesota Univ.-Duluth. Dept. of Chemistry.
PB91-144931/REB 91-01 PC **A02**/MF **A01**

EPA-R-813188
California Univ., Los Angeles. Office of Environmental Science and Engineering.
PB91-171405/REB 91-01 PC **A03**/MF **A01**
PB91-171439/REB 91-01 PC **A03**/MF **A01**

EPA-R-813336
Nevada Univ., Reno. Dept. of Biochemistry.
PB91-116913/REB 91-01 PC **A02**/MF **A01**

EPA-R-813458
New York State Coll. of Agriculture and Life Sciences, Ithaca. Dept. of Plant Pathology.
PB91-206961/REB 91-04 PC **A02**/MF **A01**

EPA-R-813486
Idaho Univ., Moscow. Dept. of Bacteriology and Biochemistry.
PB91-231258/REB 91-04 PC A03/MF A01

EPA-R-813495-01
Harvard School of Public Health, Boston, MA. Dept. of Biostatistics.
PB91-109181/REB 91-01 PC A03/MF A01
Iowa State Univ., Ames. Dept. of Statistics.
PB91-100917/REB 91-01 PC A03/MF A01

EPA-R-813594-020
John B. Pierce Foundation Lab., New Haven, CT.
PB91-146654/REB 91-01 PC A02/MF A01

EPA-R-813605
Guelph Univ. (Ontario). Dept. of Microbiology.
PB91-183350/REB 91-01 PC A03/MF A01

EPA-R-813647
Auburn Univ., AL. Dept. of Civil Engineering.
PB91-211938/REB 91-04 PC A04/MF A01

EPA-R-813769
Duke Univ. Medical Center, Durham, NC. Dept. of Pharmacology.
PB91-211409/REB 91-04 PC A02/MF A01
PB91-213496/REB 91-04 PC A03/MF A01
PB91-233429/REB 91-04 PC A02/MF A01
Northrop Services, Inc., Research Triangle Park, NC.
PB91-109207/REB 91-01 PC A03/MF A01

EPA-R813840
Baylor Coll. of Medicine, Houston, TX.
PB91-136895/REB 91-01 PC A03/MF A01

EPA-R813943
Minnesota Univ.-Duluth.
PB91-144949/REB 91-01 PC A02/MF A01
Minnesota Univ.-Duluth. Dept. of Chemistry.
PB91-144931/REB 91-01 PC A02/MF A01

EPA-R-814017-01-1
Maryland Univ., College Park. Dept. of Botany.
PB91-196287/REB 91-01 PC A02/MF A01

EPA-R-814023
New York Univ. Medical Center, Tuxedo Park. Inst. of Environmental Medicine.
PB91-109405/REB 91-01 PC A02/MF A01

EPA-R-814053
Mississippi Univ. Medical Center, Jackson. Dept. of Pharmacology and Toxicology.
PB91-109561/REB 91-01 PC A03/MF A01
PB91-109579/REB 91-01 PC A03/MF A01
PB91-191593/REB 91-01 PC A03/MF A01

EPA-R-814135-01-0
Michigan Univ., Ann Arbor.
PB91-234617/REB 91-04 PC A05/MF A01

EPA-R-814169
Research Triangle Inst., Research Triangle Park, NC.
PB91-177196/REB 91-01 PC A02/MF A01
PB91-242446/REB 91-04 PC A03/MF A01

EPA-R-814169-01-0
Research Triangle Inst., Research Triangle Park, NC.
PB91-226365/REB 91-04 PC A02/MF A01
PB91-226373/REB 91-04 PC A02/MF A01

EPA-R814169-03
Research Triangle Inst., Research Triangle Park, NC.
PB91-176735/REB 91-01 PC A02/MF A01

EPA-R-814199
Oklahoma Medical Research Foundation, Oklahoma City.
PB91-117499/REB 91-01 PC A02/MF A01

EPA-R-814243
Arizona Univ., Tucson.
PB91-117200/REB 91-01 PC A02/MF A01

EPA R-814320
Virginia Polytechnic Inst. and State Univ., Blacksburg.
PB91-231514/REB 91-04 PC A10/MF A03
Virginia Polytechnic Inst. and State Univ., Blacksburg. Center for Environmental and Hazardous Material Studies.
PB91-117465/REB 91-01 PC A03/MF A01

EPA-R-814324
Michigan Univ., Ann Arbor. School of Public Health.
PB91-176784/REB 91-01 PC A03/MF A01

EPA-R-814342
Nevada Univ., Las Vegas. Environmental Research Center.
PB91-183525/REB 91-01 PC A03/MF A01

EPA-R-814344
Duke Univ. Medical Center, Durham, NC. Dept. of Pathology.
PB91-115980/REB 91-01 PC A02/MF A01

EPA-R-814487
Cornell Univ., Ithaca, NY.
PB91-164277/REB 91-01 PC A03/MF A01

EPA-R-814501
Oregon State Univ., Corvallis. Dept. of Chemistry.
PB91-144881/REB 91-01 PC A02/MF A01

EPA-R-814512
Florida Univ., Gainesville.
PB91-116178/REB 91-01 PC A02/MF A01
PB91-116186/REB 91-01 PC A02/MF A01
PB91-116194/REB 91-01 PC A03/MF A01
PB91-171504/REB 91-01 PC A03/MF A01
Florida Univ., Gainesville. Dept. of Soil Science.
PB91-240556/REB 91-04 PC A03/MF A01

EPA-R-814676
Research Triangle Inst., Research Triangle Park, NC. Center for Economics Research.
PB91-168336/REB 91-01 PC A06/MF A01

EPA-R-814700
Research Triangle Inst., Research Triangle Park, NC.
PB91-182220/REB 91-01 PC A02/MF A01

EPA-R-814903
University City Science Center, Philadelphia, PA.
PB91-234476/REB 91-04 PC A02/MF A01
PB91-234484/REB 91-04 PC A01/MF A01
PB91-234492/REB 91-04 PC A01/MF A01
PB91-234500/REB 91-04 PC A02/MF A01
PB91-234518/REB 91-04 PC A02/MF A01
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PB91-234567/REB 91-04 PC A01/MF A01
PB91-234575/REB 91-04 PC A01/MF A01

EPA-R-815650
Arizona Univ., Tucson. Div. of Respiratory Sciences.
PB91-231357/REB 91-04 PC A02/MF A01

EPA-R-815699-01
California Univ., Riverside. Statewide Air Pollution Research Center.
PB91-233478/REB 91-04 PC A02/MF A01

EPA-R-815721
Stanford Univ., CA. Dept. of Civil Engineering.
PB91-212324/REB 91-04 PC A04/MF A01

EPA-R-815776
Minnesota Univ., Minneapolis. Dept. of Lab. Medicine.
PB91-109421/REB 91-01 PC A02/MF A01

EPA-R-815778-01-0
Denver Univ., CO. Dept. of Chemistry.
PB91-148320/REB 91-01 PC A05/MF A01

EPA-R-815941
North Carolina Univ. at Chapel Hill.
PB91-191544/REB 91-01 PC A03/MF A01

EPA-R-816070-01-0
Center for Infectious Diseases, Atlanta, GA. Div. of Bacterial Diseases.
PB91-211425/REB 91-04 PC A01/MF A01

EPA-R-816418
California Inst. of Tech., Pasadena.
PB91-183384/REB 91-01 PC A02/MF A01

EPA-R-816821
Massachusetts Univ., Amherst. Dept. of Civil Engineering.
PB91-207035/REB 91-04 PC A03/MF A01

EPA-R-913413-01-0
Oregon State Univ., Corvallis.
PB91-171629/REB 91-01 PC A02/MF A01

EPA-R8115234
Tennessee Univ., Knoxville. Center for Environmental Biotechnology.
PB91-163832/REB 91-01 PC A03/MF A01

EPA-R806013010
Delaware Univ., Newark. Coll. of Marine Studies.
PB91-146306/REB 91-01 PC A03/MF A01

EPA-R809521010
Michigan Technological Univ., Houghton. Dept. of Civil Engineering.
PB91-163501/REB 91-01 PC A02/MF A01

EPA-R810076010
Michigan Technological Univ., Houghton. Dept. of Civil Engineering.
PB91-163501/REB 91-01 PC A02/MF A01

EPA-T-901776-01-0
Duxbury (Dana) and Associates, Andover, MA.
PB91-206607/REB 91-01 PC A99/MF A04

EPA-X1-000466-01
Oregon State Dept. of Environmental Quality, Portland.
PB91-191700/REB 91-01 PC A07/MF A01
PB91-191718/REB 91-01 PC A03/MF A01

EPA-9C6155TTST
Lowry Engineering, Inc., Unity, ME.
PB91-125633/REB 91-01 PC A04/MF A01

EPA-9D4-25-NALX
California Inst. of Tech., Pasadena.
PB91-183384/REB 91-01 PC A02/MF A01

EPA-68-01-4456
Environmental Health Research and Testing, Inc., Research Triangle Park, NC.
PB91-182238/REB 91-01 PC A03/MF A01

EPA-68-01-6272
Woods Hole Oceanographic Institution, MA. Dept. of Ocean Engineering.
PB91-127738/REB 91-01 PC A03/MF A01

EPA-68-01-6849
Program Resources, Inc., Research Triangle Park, NC.
PB91-109801/REB 91-01 PC A05/MF A01

EPA-68-01-6871
Jordan (Edward C.) Co., Inc., Portland, ME.
PB91-102046/REB 91-01 PC A05/MF A01

EPA-68-01-6989
Pirnie (Malcolm), Inc., White Plains, NY.
PB91-242388/REB 91-04 PC A14/MF A03

EPA-68-01-7050
Science Applications International Corp., McLean, VA.
PB91-145680/REB 91-01 PC A06/MF A01

EPA-68-01-7266
Dynamac Corp., Rockville, MD.
PB91-164293/REB 91-01 PC A13/MF A02

EPA-68-01-7281
Apogee Research, Inc., Bethesda, MD.
PB91-168393/REB 91-01 PC A05/MF A01

EPA-68-01-7287
Midwest Research Inst., Kansas City, MO.
PB91-111492/REB 91-01 PC A03/MF A01
Midwest Research Inst., Minneapolis, MN.
PB91-101865/REB 91-01 PC A09/MF A01

EPA-68-01-7310
Franklin Associates Ltd., Prairie Village, KS.
PB91-108977/REB 91-01 PC A05/MF A01

EPA-68-01-7331
Booz-Allen and Hamilton, Inc., Bethesda, MD.
PB91-186999/REB 91-04 PC A23/MF A03

EPA-68-01-7363
Dynamac Corp., Rockville, MD.
PB91-154591/REB 91-01 PC A05/MF A01
PB91-154609/REB 91-01 PC A99/MF E09

EPA-68-01-7365
Computer Sciences Corp., Research Triangle Park, NC.
PB91-131268/REB 91-01 PC A11/MF A02
PB91-131664/REB 91-01 PC A02/MF A01
PB91-159707/REB 91-01 PC A03/MF A01
PB91-161729/REB 91-01 PC A13/MF A02
PB91-171926/REB 91-01 PC A16/MF A02
PB91-171934/REB 91-01 PC A19/MF A03
PB91-171942/REB 91-01 PC A13/MF A02
PB91-206268/REB 91-04 PC A06/MF A01
PB91-223362/REB 91-04 PC A10/MF A03
PB91-233460/REB 91-04 PC A02/MF A01

EPA-68-01-7383
Midwest Research Inst., Falls Church, VA.
PB91-113860/REB 91-01 PC A08/MF A01
Midwest Research Inst., Kansas City, MO.
PB91-129825/REB 91-01 PC A05/MF A01

EPA-68-01-7481
ICF, Inc., Fairfax, VA.
PB91-125674/REB 91-01 PC A06/MF A01

EPA-68-02-2374
Northrop Services, Inc./Environmental Sciences, Research Triangle Park, NC.
PB91-101691/REB 91-01 PC A12/MF A02
PB91-101709/REB 91-01 PC A14/MF A02
PB91-101758/REB 91-01 PC A08/MF A01

EPA-68-02-2566
Northrop Services, Inc./Environmental Sciences, Research Triangle Park, NC.
PB91-109140/REB 91-01 PC A02/MF A01

EPA-68-02-3456
Utah Univ., Salt Lake City.
PB91-109157/REB 91-01 PC A03/MF A01

EPA-68-02-3633
Energy and Environmental Research Corp., Irvine, CA.
PB91-223347/REB 91-04 PC A03/MF A01

EPA-68-02-3659
Life Systems, Inc., Cleveland, OH.
PB91-143396/REB 91-01 PC A09/MF A02

EPA-68-02-3968
Acurex Corp., Research Triangle Park, NC.
PB91-177030/REB 91-01 PC A03/MF A01
PB91-196444/REB 91-01 PC A03/MF A01

EPA-68-02-3994
Radian Corp., Research Triangle Park, NC.
PB91-136952/REB 91-01 PC A03/MF A01

EPA-68-02-4032
Northrop Services, Inc./Environmental Sciences, Research Triangle Park, NC.
PB91-109124/REB 91-01 PC A03/MF A01
Northrop Services, Inc./Environmental Sciences, Research Triangle Park, NC. Inhalation Toxicology Group.
PB91-109249/REB 91-01 PC A03/MF A01

Northrop Services, Inc., Research Triangle Park, NC.
PB91-109132/REB 91-01 PC **A02**/MF **A01**
PB91-109702/REB 91-01 PC **A03**/MF **A01**
PB91-116079/REB 91-01 PC **A03**/MF **A01**

EPA-68-02-4033
Northrop Services, Inc./Environmental Sciences, Research Triangle Park, NC.
PB91-211359/REB 91-04 PC **A02**/MF **A01**

EPA-68-02-4125
Research Triangle Inst., Research Triangle Park, NC.
PB91-154211/REB 91-01 PC **A08**/MF **A01**

EPA-68-02-4127
Battelle Columbus Div., OH.
PB91-109934/REB 91-01 PC **A02**/MF **A01**
Battelle, Columbus, OH.
PB91-126029/REB 91-01 PC **A05**/MF **A01**

EPA-68-02-4141
Ohio State Univ., Columbus. Dept. of Physiological Chemistry.
PB91-109751/REB 91-01 PC **A03**/MF **A01**

EPA-68-02-4175
University of South Florida, Tampa. Coll. of Public Health.
PB91-171835/REB 91-01 PC **A02**/MF **A01**

EPA-68-02-4245
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Computer-Readable TSCA Chemical Substances Inventory. Data Tape Documentation.
PB91-167767/REB 91-01 PC **A03**/MF **A01**

EPA/DF/MT-91/083
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PB91-507319/REB 91-01 CP **T02**

EPA/DF/MT-91/085
Toxic Release Inventory (TRI), 1989.
PB91-507509/REB 91-01 CP **T14**

EPA/DF/MT-91/085A
Toxic Release Inventory, 1989. Magnetic Tape Documentation.
PB91-187500/REB 91-01 PC **A07**/MF **A01**

EPA/DF/MT-91/101
Toxic Substances Control Act (TSCA) Chemical Substances Inventory: Revised Inventory Synonym and Preferred Name File, June 1991.
PB91-510024/REB 91-04 CP **T05**

EPA/IMSD-91/100
Access EPA: Public Information Tools, Major EPA Dockets, Clearinghouses and Hotlines, Records Management Programs, Major EPA Environmental Databases, Library and Information Services, State Environmental Libraries. 1991 Edition.
PB91-151563/REB 91-04 PC**$18.00**/MF **A04**

EPA/IMSD-91/101
Access EPA: Public Information Tools. 1991 Edition.
PB91-151571/REB 91-04 PC **E99**/MF **A02**

EPA/IMSD-91/102
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PB91-151589/REB 91-04 PC **E99**/MF **A01**

EPA/IMSD-91/103
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PB91-151597/REB 91-04 PC **E99**/MF **A01**

EPA/IMSD-91/104
Access EPA: Records Management Programs. 1991 Edition.
PB91-151605/REB 91-04 PC **E99**/MF **A01**

EPA/IMSD-91/105
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PB91-151613/REB 91-04 PC **E99**/MF **A01**

EPA/IMSD-91/106
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PB91-151621/REB 91-04 PC **E99**/MF **A02**

EPA/IMSD-91/107
Access EPA. State Environmental Libraries. 1991 Edition.
PB91-151639/REB 91-04 PC **E99**/MF **A02**

EPA/ROD/R01-90/033
Superfund Record of Decision (EPA Region 1): Old Springfield Landfill, Springfield, VT. (Second Remedial Action), September 1990.
PB91-921420/REB 91-04 PC **A17**/MF **A04**

EPA/ROD/R01-90/047
Superfund Record of Decision (EPA Region 1): Coakley Landfill, North Hampton, New Hampshire (First Remedial Action), June 28, 1990.
PB91-921401/REB 91-01 PC **A12**/MF **A02**

EPA/ROD/R01-90/048
Superfund Record of Decision (EPA Region 1): Stamina Mills Site, North Smithfield, RI. (First Remedial Action), September 1990.
PB91-921421/REB 91-04 PC **A10**/MF **A03**

EPA/ROD/R01-90/049
Superfund Record of Decision (EPA Region 1): Baird and McGuire/Alternate Water Supply, Holbrook, MA. (Third Remedial Action), September 1990.
PB91-921419/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R01-90/050
Superfund Record of Decision (EPA Region 1): Beacon Heights Landfill Site, Beacon Falls, CT. (First Remedial Action), September 1990. (Supplemental).
PB91-921418/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R01-90/051
Superfund Record of Decision (EPA Region 1): Kearsarge Metallurgical Corporation, Conway, NH. (First Remedial Action), September 1990.
PB91-921416/REB 91-04 PC **A12**/MF **A03**

EPA/ROD/R02-90/101
Superfund Record of Decision (EPA Region 2): Woodland Township Route 72 Site, Burlington County, New Jersey (First Remedial Action), May 16, 1990.
PB91-921402/REB 91-01 PC **A06**/MF **A01**

EPA/ROD/R02-90/102
Superfund Record of Decision (EPA Region 2): Woodland Township Route 72 and Route 532 Dump Sites, Burlington County, Chatsworth, NJ. (First Remedial Action), May 1990.
PB91-921426/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R02-90/103
Superfund Record of Decision (EPA Region 2): Radium Chemical Company Site, Woodside, Queens County, New York (First Remedial Action), Final Report, June 21, 1990.
PB91-921403/REB 91-01 PC **A04**/MF **A01**

EPA/ROD/R02-90/104
Superfund Record of Decision (EPA Region 2): Sealand Restoration Site, Town of Lisbon, St. Lawrence County, NY. (First Remedial Action), September 1990.
PB91-921424/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R02-90/105
Superfund Record of Decision (EPA Region 2): FAA Technical Center, Area 20A - Salvage Yard, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921425/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R02-90/106
Superfund Record of Decision (EPA Region 2): Lone Pine Landfill, Freehold Township, Monmouth County, NJ. (Second Remedial Action), September 1990.
PB91-921430/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R02-90/107
Superfund Record of Decision (EPA Region 2): Syosset Landfill, Nassau County, Syosset, NY. (First Remedial Action), September 1990.
PB91-921549/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R02-90/108
Superfund Record of Decision (EPA Region 2): M and T DeLisa Landfill Site, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921429/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R02-90/109
Superfund Record of Decision (EPA Region 2): Scientific Chemical Processing Site, Carlstadt, Bergen County, NJ. (First Remedial Action), September 1990.
PB91-921423/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R02-90/110
Superfund Record of Decision (EPA Region 2): American Thermostat Site, South Cairo, Green County, New York (Second Remedial Action), Final Report, June 29, 1990.
PB91-921556/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R02-90/111
Superfund Record of Decision (EPA Region 2): Solvent Savers Site, Chenango County, New York (First Remedial Action), Final Report, September 28, 1990.
PB91-921557/REB 91-04 PC **A12**/MF **A03**

EPA/ROD/R02-90/112
Superfund Record of Decision (EPA Region 2): Mannheim Avenue Dump Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921495/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R02-90/113
Superfund Record of Decision (EPA Region 2): King of Prussia Technical Corporation Site, Winslow Township, Camden County, NJ. (First Remedial Action), September 1990.
PB91-921503/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R02-90/114
Superfund Record of Decision (EPA Region 2): Chemical Leaman Tank Lines Site, Logan Township, Gloucester County, NJ. (First Remedial Action), September 1990.
PB91-921529/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R02-90/115
Superfund Record of Decision (EPA Region 2): Myers Property, Franklin Township, NJ. (First Remedial Action), September 1990.
PB91-921428/REB 91-04 PC **A06/MF A02**

EPA/ROD/R02-90/116
Superfund Record of Decision (EPA Region 2): Metaltec/Aerosystems, Franklin Borough, Sussex County, NJ. (Second Remedial Action), September 1990.
PB91-921527/REB 91-04 PC **A05/MF A01**

EPA/ROD/R02-90/117
Superfund Record of Decision (EPA Region 2): Hooker-102nd Street Landfill, Niagara Falls, NY. (First Remedial Action), September 1990.
PB91-921417/REB 91-04 PC **A05/MF A01**

EPA/ROD/R02-90/118
Superfund Record of Decision (EPA Region 2): Higgins Farm, Franklin Township, Somerset County, NJ. (First Remedial Action), September 1990.
PB91-921496/REB 91-04 PC **A03/MF A01**

EPA/ROD/R02-90/119
Superfund Record of Decision (EPA Region 2): Mattiace Petrochemical Company, Broome County, Glen Cove, NY. (First Remedial Action), September 1990.
PB91-921533/REB 91-04 PC **A03/MF A01**

EPA/ROD/R02-90/120
Superfund Record of Decision (EPA Region 2): Pomona Oaks Well Contamination Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921497/REB 91-04 PC **A05/MF A01**

EPA/ROD/R02-90/121
Superfund Record of Decision (EPA Region 2): Hooker Chemical/Ruco Polymer Site, Hicksville, NY. (First Remedial Action), September 1990.
PB91-921427/REB 91-04 PC **A07/MF A02**

EPA/ROD/R02-90/122
Superfund Record of Decision (EPA Region 2): Sayreville Landfill Site, Borough of Sayreville, Middlesex County, New Jersey (First Remedial Action), September 28, 1990.
PB91-921558/REB 91-04 PC **A13/MF A03**

EPA/ROD/R02-90/123
Superfund Record of Decision (EPA Region 2): Claremont Polychemical, Nassau County, Old Bethpage, NY. (Second Remedial Action), September 1990.
PB91-921526/REB 91-04 PC **A07/MF A02**

EPA/ROD/R02-90/124
Superfund Record of Decision (EPA Region 2): Sarney Farm, Amenia, Dutchess County, NY. (First Remedial Action), September 1990.
PB91-921422/REB 91-04 PC **A07/MF A02**

EPA/ROD/R02-90/125
Superfund Record of Decision (EPA Region 2): Glen Ridge Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921436/REB 91-04 PC **A04/MF A01**

EPA/ROD/R02-90/126
Superfund Record of Decision (EPA Region 2): Montclair/West Orange Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921431/REB 91-04 PC **A04/MF A01**

EPA/ROD/R02-90/127
Superfund Record of Decision (EPA Region 2): Cinnaminson Groundwater Contamination Site, Burlington County, NJ. (First Remedial Action), September 1990.
PB91-921548/REB 91-04 PC **A08/MF A02**

EPA/ROD/R02-90/128
Superfund Record of Decision (EPA Region 2): Imperial Oil/Champion Chemicals, Marlboro Township, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921498/REB 91-04 PC **A04/MF A01**

EPA/ROD/R02-90/129
Superfund Record of Decision: (EPA Region 2): Kentucky Avenue Wellfield Site, Town of Horseheads, Chemung County, New York (Second Remedial Action), September 28, 1990.
PB91-921551/REB 91-04 PC **A15**

EPA/ROD/R02-90/130
Superfund Record of Decision (EPA Region 2): Vestal Water Supply Well No. 1-1, Broome County, Vestal, NY. (Second Remedial Action), September 1990.
PB91-921499/REB 91-04 PC **A06/MF A02**

EPA/ROD/R03-90/083
Superfund Record of Decision (EPA Region 3): U.S. Titanium Superfund Site, Nelson County, Virginia (First Remedial Action), Final Report, November 29, 1990.
PB91-921559/REB 91-04 PC **A07/MF A02**

EPA/ROD/R03-90/087
Superfund Record of Decision (EPA Region 3): W. M. Manufacturing Superfund Site, Danville, Pennsylvania (Second Remedial Action), June 29, 1990.
PB91-921404/REB 91-01 PC **A04/MF A01**

EPA/ROD/R03-90/088
Superfund Record of Decision (EPA Region 3): Croydon TCE Site, Bucks County, Pennsylvania (Second Remedial Action), Final Report, June 29, 1990.
PB91-921405/REB 91-01 PC **A07/MF A01**

Superfund Record of Decision (EPA Region 3): Croyden TCE Site, Bristol Township, Bucks County, PA. (Second Remedial Action), June 1990.
PB91-921435/REB 91-04 PC **A07/MF A01**

EPA/ROD/R03-90/089
Superfund Record of Decision (EPA Region 3): Walsh Landfill Site, Chester County, Pennsylvania (First Remedial Action), June 29, 1990.
PB91-921406/REB 91-01 PC **A05/MF A01**

EPA/ROD/R03-90/090
Superfund Record of Decision (EPA Region 3): Lord-Shope Landfill Site, Erie County, Pennsylvania (First Remedial Action), Final Report, June 29, 1990.
PB91-921407/REB 91-01 PC **A05/MF A01**

EPA/ROD/R03-90/091
Superfund Record of Decision (EPA Region 3): Army Creek Landfill Site, New Castle, Delaware (Second Remedial Action), Final Report, June 29, 1990.
PB91-921408/REB 91-01 PC **A04/MF A01**

EPA/ROD/R03-90/093
Superfund Record of Decision (EPA Region 3): Avtex Fibers Site, Front Royal, VA. (Second Remedial Action), September 1990.
PB91-921432/REB 91-04 PC **A04/MF A01**

EPA/ROD/R03-90/094
Superfund Record of Decision (EPA Region 3): Brown's Battery Breaking Site, Tilden Township, PA. (First Remedial Action), September 1990.
PB91-921437/REB 91-04 PC **A05/MF A01**

EPA/ROD/R03-90/095
Superfund Record of Decision (EPA Region 3): Butz Landfill Superfund Site, Jackson Township, Monroe County, PA. (First Remedial Action), September 1990.
PB91-921438/REB 91-04 PC **A03/MF A01**

EPA/ROD/R03-90/096
Superfund Record of Decision (EPA Region 3): Coker's Sanitation Service Landfills, Kent County, DE. (First Remedial Action), September 1990.
PB91-921550/REB 91-04 PC **A05/MF A01**

EPA/ROD/R03-90/097
Superfund Record of Decision (EPA Region 3): Cryo-Chem Site, Earl Township, Berks County, PA. (Second Remedial Action), September 1990.
PB91-921502/REB 91-04 PC **A06/MF A02**

EPA/ROD/R03-90/098
Superfund Record of Decision (EPA Region 3): Sand, Gravel and Stone Site, Elkton, MD. (Second Remedial Action), September 1990.
PB91-921439/REB 91-04 PC **A05/MF A01**

EPA/ROD/R03-90/099
Superfund Record of Decision (EPA Region 3): Osborne Landfill Site, Pine Township, Mercer County, PA. (First Remedial Action), September 1990.
PB91-921440/REB 91-04 PC **A09/MF A01**

EPA/ROD/R03-90/100
Superfund Record of Decision (EPA Region 3): Raymark Site, Hatboro Borough, Montgomery County, PA. (First Remedial Action), September 1990.
PB91-921504/REB 91-04 PC **A08/MF A02**

EPA/ROD/R03-90/101
Superfund Record of Decision (EPA Region 3): Keystone Sanitation Landfill Site, Adams County, Union Township, PA. (First Remedial Action), September 1990.
PB91-921434/REB 91-04 PC **A07/MF A01**

EPA/ROD/R03-90/102
Superfund Record of Decision (EPA Region 3): Tyson Dump Number 1, Upper Merion Township, Montgomery County, PA. (Third Remedial Action), September 1990.
PB91-921516/REB 91-04 PC **A04/MF A01**

EPA/ROD/R03-90/103
Superfund Record of Decision (EPA Region 3): East Mt. Zion Landfill, Springettsbury Township, York County, PA. (First Remedial Action), September 1990.
PB91-921441/REB 91-04 PC **A05/MF A01**

EPA/ROD/R03-90/104
Superfund Record of Decision (EPA Region 3): Dover Air Force Base, DE. (First Remedial Action), September 1990.
PB91-921505/REB 91-04 PC **A04/MF A01**

EPA/ROD/R03-90/105
Superfund Record of Decision (EPA Region 3): Fike/Artel Chemical Site, Nitro, WV. (Second Remedial Action), September 1990.
PB91-921433/REB 91-04 PC **A03/MF A01**

EPA/ROD/R04-90/059
Superfund Record of Decision (EPA Region 4): City Industries, Winter Park, FL. (First Remedial Action), March 1990.
PB91-921530/REB 91-04 PC **A05/MF A01**

EPA/ROD/R04-90/060
Superfund Record of Decision (EPA Region 4): Hipps Road Landfill Site, Duval County, Jacksonville, FL. (First Remedial Action), (Amendment), September 1990.
PB91-921506/REB 91-04 PC **A11/MF A03**

EPA/ROD/R04-90/061
Superfund Record of Decision (EPA Region 4): Schuylkill Metal, Hillsborough County, Plant City, FL. (First Remedial Action), September 1990.
PB91-921501/REB 91-04 PC **A06/MF A02**

EPA/ROD/R04-90/062
Superfund Record of Decision (EPA Region 4): Munisport Landfill Site, Dade County, North Miami, FL. (First Remedial Action), July 1990.
PB91-921525/REB 91-04 PC **A09/MF A02**

EPA/ROD/R04-90/063
Superfund Record of Decision (EPA Region 4): Howe Valley Landfill, Howe Valley, KY. (First Remedial Action), September 1990.
PB91-921539/REB 91-04 PC **A11/MF A03**

EPA/ROD/R04-90/065
Superfund Record of Decision (EPA Region 4): Harris/Palm Bay Facility, Palm Bay, Brevard County, FL. (First Remedial Action), June 1990.
PB91-921442/REB 91-04 PC **A06/MF A01**

EPA/ROD/R04-90/066
Superfund Record of Decision (EPA Region 4): Coleman Evans Wood Preserving Site, Duval County, Jacksonville, Florida (First Remedial Action (Amendment)), Final Report, September 9, 1990.
PB91-921560/REB 91-04 PC **A07/MF A02**

EPA/ROD/R04-90/067
Superfund Record of Decision (EPA Region 4): Yellow Water Road Site, Duval County, Baldwin, FL. (First Remedial Action), September 1990.
PB91-921546/REB 91-04 PC **A06/MF A02**

EPA/ROD/R04-90/068
Superfund Record of Decision (EPA Region 4): North Hollywood Dump, TN. (First Remedial Action), September 1990.
PB91-921443/REB 91-04 PC **A13/MF A02**

EPA/ROD/R04-90/069
Superfund Record of Decision (EPA Region 4): Lewisburg Dump Site, Lewisburg, Marshall County, Tennessee (First Remedial Action), Final Report, September 19, 1990.
PB91-921561/REB 91-04 PC **A11/MF A03**

EPA/ROD/R04-90/070
Superfund Record of Decision (EPA Region 4): 62nd Street Dump, Hillsborough County, Tampa, FL. (First Remedial Action), June 1990.
PB91-921507/REB 91-04 PC **A05/MF A01**

EPA/ROD/R04-90/071
Superfund Record of Decision (EPA Region 4): Dubose Oil Products Site, Cantonment, Escambia County, FL. (First Remedial Action), March 1990.
PB91-921444/REB 91-04 PC **A04/MF A01**

EPA/ROD/R04-90/072
Superfund Record of Decision (EPA Region 4): Kassouf-Kimerling Battery Site, Tampa, Hillsborough County, FL. (Second Remedial Action), March 1990.
PB91-921445/REB 91-04 PC **A04/MF A01**

EPA/ROD/R04-90/073
Superfund Record of Decision (EPA Region 4): National Starch and Chemical Corporation Site, Salisbury, NC. (Second Remedial Action), September 1990.
PB91-921446/REB 91-04 PC **A08/MF A02**

EPA/ROD/R04-90/074
Superfund Record of Decision (EPA Region 4): SCRDI Bluff Road Site, Columbia, Richland County, SC. (First Remedial Action), September 1990.
PB91-921447/REB 91-04 PC **A06/MF A02**

EPA/ROD/R04-90/075
Superfund Record of Decision (EPA Region 4): Pickettville Road Landfill, Jacksonville, Duval County, FL. (First Remedial Action), September 1990.
PB91-921448/REB 91-04 PC **A05/MF A01**

EPA/ROD/R04-90/076
Superfund Record of Decision (EPA Region 4): Zellwood Groundwater Contamination Site, (Operable Unit 1), Orange County, Zellwood, FL. (First Remedial Action), (Amendment), March 1990.
PB91-921508/REB 91-04 PC **A04/MF A01**

EPA/ROD/R04-90/077
Superfund Record of Decision (EPA Region 4): Cabot Carbon/Koppers Site, Gainesville, Alachua County, FL. (First Remedial Action), September 1990.
PB91-921449/REB 91-04 PC **A07/MF A01**

EPA/ROD/R04-90/078
Superfund Record of Decision (EPA Region 4): Bypass 601 Groundwater Contamination Site (Martin Scrap Recycling Facility), Concord, NC. (First Remedial Action), August 1990.
PB91-921531/REB 91-04 PC **A04/MF A01**

EPA/ROD/R05-90/121
Superfund Record of Decision (EPA Region 5): NL Industries/Taracorp Lead Smelting, Granite City, IL. (First Remedial Action), March 1990.
PB91-921515/REB 91-04 PC **A09/MF A03**

EPA/ROD/R05-90/122
Superfund Record of Decision (EPA Region 5): Tri-State Plating, Columbus, IN. (First Remedial Action), March 1990.
PB91-921450/REB 91-04 PC **A03/MF A01**

EPA/ROD/R05-90/123
Superfund Record of Decision (EPA Region 5): Wayne Reclamation and Recycling, Columbia City, Indiana (First Remedial Action), Final Report, March 30, 1990.
PB91-921552/REB 91-04 PC **A05/MF A02**

EPA/ROD/R05-90/124
Superfund Record of Decision (EPA Region 5): Sangamo/Crab Orchard National Wildlife Refuge (USDOI), Carterville, IL. (First Remedial Action), August 1990.
PB91-921509/REB 91-04 PC **A06/MF A02**

EPA/ROD/R05-90/125
Superfund Record of Decision (EPA Region 5): Onalaska Municipal Landfill Site, Lacrosse County, Wisconsin (First Remedial Action), Final Report, August 14, 1990.
PB91-921410/REB 91-01 PC **A06/MF A01**

EPA/ROD/R05-90/126
Superfund Record of Decision (EPA Region 5): Spiegelberg Site, Green Oak Township, Livingston County, Michigan (First Remedial Action), Final Report, June 29, 1990.
PB91-921553/REB 91-04 PC **A04/MF A01**

EPA/ROD/R05-90/127
Superfund Record of Decision (EPA Region 5): Hagen Farm Site, Source Control Operable Unit, Dane County, WI. (First Remedial Action), September 1990.
PB91-921545/REB 91-04 PC **A03/MF A01**

EPA/ROD/R05-90/128
Superfund Record of Decision (EPA Region 5): Fisher-Calo Chem, Kingsbury, IN. (First Remedial Action), August 1990.
PB91-921451/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/129
Superfund Record of Decision (EPA Region 5): Oconomowoc Electroplating Company Site, Ashippun, WI. (First Remedial Action), September 1990.
PB91-921517/REB 91-04 PC **A05**/MF **A02**

EPA/ROD/R05-90/130
Superfund Record of Decision (EPA Region 5): Wheeler Pit Site, La Prairie Township, WI. (First Remedial Action), September 1990.
PB91-921452/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/132
Superfund Record of Decision (EPA Region 5): Pristine, Inc., Reading, OH. (First Remedial Action), March 1990. (Amendment).
PB91-921453/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R05-90/133
Superfund Record of Decision (EPA Region 5): K and L Landfill, Kalamazoo, MI. (First Remedial Action), September 1990.
PB91-921454/REB 91-04 PC **A02**/MF **A01**

EPA/ROD/R05-90/134
Superfund Record of Decision (EPA Region 5): Kummer Sanitary Landfill, Northern Township, Beltrami County, MN. (Third Remedial Action), September 1990.
PB91-921547/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/135
Superfund Record of Decision (EPA Region 5): Ott/Story/Cordova Chemical Site, North Muskegon, MI. (Second Remedial Action), September 1990.
PB91-921455/REB 91-04 PC **A05**/MF **A02**

EPA/ROD/R05-90/136
Superfund Record of Decision (EPA Region 5): Naval Industrial Reserve Ordnance Plant, Fridley, MN. (First Remedial Action), September 1990.
PB91-921456/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/137
Superfund Record of Decision (EPA Region 5): Anderson Development Company Site, Adrian, Michigan (First Remedial Action), Final Report, September 28, 1990.
PB91-921562/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/138
Superfund Record of Decision (EPA Region 5): National Presto Industries, Eau Claire, WI. (First Remedial Action), August 1990.
PB91-921457/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/139
Superfund Record of Decision (EPA Region 5): St. Louis River/Interlake/Duluth Tar Site, Duluth, MN. (First Remedial Action), September 1990.
PB91-921458/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/140
Superfund Record of Decision (EPA Region 5): Clare Water Supply, Clare County, MI. (First Remedial Action), August 1990.
PB91-921459/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R05-90/141
Superfund Record of Decision (EPA Region 5): University of Minnesota Rosemount Research Center, MN. (First Remedial Action), June 1990.
PB91-921460/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R05-90/142
Superfund Record of Decision (EPA Region 5): Moss-American Kerr-McGee Oil Site, Milwaukee, WI. (First Remedial Action), September 1990.
PB91-921461/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R05-90/143
Superfund Record of Decision (EPA Region 5): Springfield Township Dump Site, Oakland County, MI. (First Remedial Action), September 1990.
PB91-921462/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R05-90/144
Superfund Record of Decision (EPA Region 5): Metamora Landfill, Metamora, Lapeer County, MI. (Second Remedial Action), September 1990.
PB91-921463/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/145
Superfund Record of Decision (EPA Region 5): Algoma Municipal Landfill, Algoma, WI. (First Remedial Action), September 1990.
PB91-921518/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/146
Superfund Record of Decision (EPA Region 5): Master Disposal Service Landfill, Brookfield, WI. (First Remedial Action), September 1990.
PB91-921524/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/147
Superfund Record of Decision (EPA Region 5): Reilly Tar and Chemical Corporation Site, St. Peter Aquifer, St. Louis Park, MN. (Third Remedial Action), September 1990.
PB91-921519/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R05-90/148
Superfund Record of Decision (EPA Region 5): Hunts Disposal Landfill Site, Town of Caledonia, WI. (First Remedial Action), September 1990.
PB91-921464/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R05-90/149
Superfund Record of Decision (EPA Region 5): Union Scrap Iron Metal, Hennepin County, Minneapolis, MN. (First Remedial Action), March 1990.
PB91-921465/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R05-90/150
Superfund Record of Decision (EPA Region 5): Bofors-Nobel Site, Muskegon, MI. (First Remedial Action), September 1990.
PB91-921466/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/055
Superfund Record of Decision (EPA Region 6): Jacksonville Municipal Landfill Superfund Site, AR. (First Remedial Action), September 1990.
PB91-921467/REB 91-04 PC **A09**/MF **A02**

EPA/ROD/R06-90/056
Superfund Record of Decision (EPA Region 6): Vertac, Inc., Jacksonville, AR. (First Remedial Action), September 1990.
PB91-921513/REB 91-04 PC **A09**/MF **A02**

EPA/ROD/R06-90/057
Superfund Record of Decision (EPA Region 6): Texarkana Wood Preserving Company, Texarkana, Bowie County, TX. (First Remedial Action), September 1990.
PB91-921468/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/058
Superfund Record of Decision (EPA Region 6): Pagano Salvage Site, Los Lunas, NM. (First Remedial Action), September 1990.
PB91-921520/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R06-90/059
Superfund Record of Decision (EPA Region 6): Tenth Street Dump/Junkyard, Oklahoma City, OK. (First Remedial Action), September 1990.
PB91-921469/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/060
Superfund Record of Decision (EPA Region 6): Cimarron Mining Corporation Site, Operable Unit 1, Lincoln County, Carrizozo, NM. (First Remedial Action), September 1990.
PB91-921543/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R06-90/061
Superfund Record of Decision (EPA Region 6): Tinker AFB (Soldier Creek/Bldg. 3001), OK. (First Remedial Action), August 1990.
PB91-921470/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R06-90/062
Superfund Record of Decision (EPA Region 6): Crystal Chemical Site, Houston, TX. (First Remedial Action), September 1990.
PB91-921510/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R06-90/063
Superfund Record of Decision (EPA Region 6): Rogers Road Municipal Landfill, Pulaski County, Arkansas (First Remedial Action), Final Report, September 27, 1990.
PB91-921563/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R06-90/064
Superfund Record of Decision (EPA Region 6): Arkwood, Inc., Omaha, AR. (First Remedial Action), September 1990.
PB91-921521/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R07-90/033
Superfund Record of Decision (EPA Region 7): Northwestern States Portland Cement Company Site, Mason City, IA. (First Remedial Action), June 1990.
PB91-921471/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/034
Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination (East Industrial Park), NE (First Remedial Action), September 1990.
PB91-921472/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R07-90/035
Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination FAR-MAR-CO Subsite, Hastings Irrigation Pipe Company TCA Soils Operable Unit, Hastings, NE. (Second Remedial Action), September 1990.
PB91-921473/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/036
Superfund Record of Decision (EPA Region 7): Lindsay Manufacturing Company, Lindsay, NE. (First Remedial Action), September 1990.
PB91-921474/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R07-90/037
Superfund Record of Decision (EPA Region 7): Midwest Manufacturing/North Farm Site, Midwest Operable Unit, Kellogg, IA. (First Remedial Action), September 1990.
PB91-921475/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R07-90/038
Superfund Record of Decision (EPA Region 7): Missouri Electric Works Site, Cape Girardeau, MO. (First Remedial Action), September 1990.
PB91-921476/REB 91-04 PC **A05**/MF **A02**

EPA/ROD/R07-90/039
Superfund Record of Decision (EPA Region 7): Waverly Ground Water Contamination Site, Waverly, NE. (First Remedial Action), September 1990.
PB91-921477/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/040
Superfund Record of Decision (EPA Region 7): White Farm Equipment Company Dump Site, Floyd County, Charles City, IA. (First Remedial Action), September 1990.
PB91-921514/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R07-90/041
Superfund Record of Decision (EPA Region 7): Fairfield Coal Gasification Site, Fairfield, IA. (First Remedial Action), September 1990.
PB91-921478/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R07-90/042
Superfund Record of Decision (EPA Region 7): Shenandoah Stables, Lincoln County, MO. (Second Remedial Action), September 1990.
PB91-921541/REB 91-04 PC **A03**/MF **A01**

EPA/ROD/R07-90/043
Superfund Record of Decision (EPA Region 7): Weldon Spring Quarry/Plant/Pits (USDOE), Weldon Spring, MO. (Second Remedial Action), September 1990.
PB91-921564/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R07-90/044
Superfund Record of Decision (EPA Region 7): Wheeling Disposal Service Company Landfill, Amazonia, MO. (First Remedial Action), September 1990.
PB91-921532/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/028
Superfund Record of Decision (EPA Region 8): Whitewood Creek Site, Lawrence, Meade, and Butte Counties, South Dakota (First Remedial Action), Final Report, March 30, 1990.
PB91-921409/REB 91-01 PC **A05**/MF **A01**

EPA/ROD/R08-90/029
Superfund Record of Decision (EPA Region 8): Portland Cement Co. (Kiln Dust No. 2 and No. 3) Operable Unit 1, Salt Lake City, UT. (First Remedial Action), September 1990.
PB91-921540/REB 91-04 PC **A07**/MF **A02**

EPA/ROD/R08-90/030
Superfund Record of Decision (EPA Region 8): Silver Bow Creek/Butte Area NPL Site, Warm Springs Ponds Operable Unit, Upper Clark Fork River Basin, MT. (First Remedial Action), September 1990.
PB91-921528/REB 91-04 PC **A20**/MF **A04**

EPA/ROD/R08-90/031
Superfund Record of Decision (EPA Region 8): Sand Creek Industrial Site, Commerce City, CO. (Second Remedial Action), September 1990.
PB91-921479/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/032
Superfund Record of Decision (EPA Region 8): Ogden Defense Depot (Operable Unit 2), Weber County, Ogden, UT. (First Remedial Action), September 1990.
PB91-921480/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R08-90/033
Superfund Record of Decision (EPA Region 8): Mystery Bridge at Highway 20, Natrona County, WY. (First Remedial Action), September 1990.
PB91-921481/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R08-90/034
Superfund Record of Decision (EPA Region 8): Monticello Mill Tailings Site, San Juan County, UT. (First Remedial Action), August 1990.
PB91-921482/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/035
Superfund Record of Decision (EPA Region 8): Martin Marietta Astronautics Group Site, Waterton, CO. (First Remedial Action), September 1990.
PB91-921483/REB 91-04 PC **A08**/MF **A02**

EPA/ROD/R08-90/036
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 16), CO. (Second Remedial Action), February 1990.
PB91-921484/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R08-90/037
Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 17), CO. (Eighth Remedial Action), February 1990.
PB91-921512/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/038
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 18), CO. (Third Remedial Action), February 1990.
PB91-921485/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/039
Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 19), CO. (Fourth Remedial Action), February 1990.
PB91-921511/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R08-90/040
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 20), CO. (Fifth Remedial Action), March 1990.
PB91-921486/REB 91-04 PC **A04**/MF **A01**

EPA/ROD/R08-90/041
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 22), Colorado (Sixth Remedial Action), Final Report, May 3, 1990.
PB91-921554/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/042
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 23), Adams County, Colorado (Seventh Remedial Action), Final Draft, March 1990.
PB91-921555/REB 91-04 PC **A05**/MF **A01**

EPA/ROD/R08-90/043
Superfund Record of Decision (EPA Region 8): Rocky Flats Plant (DOE), Northern Jefferson County, CO. (First Remedial Action), January 1990.
PB91-921487/REB 91-04 PC **A19**/MF **A04**

EPA/ROD/R08-90/044
Superfund Record of Decision (EPA Region 8): Sharon Steel (Midvale Tailings), Midvale, UT. (First Remedial Action), September 1990.
PB91-921488/REB 91-04 PC **A06**/MF **A02**

EPA/ROD/R09-89/038
Superfund Record of Decision (EPA Region 9): Coast Wood Preserving, Inc., Ukiah, CA. (First Remedial Action, September 1989).
PB91-921415/REB 91-01 PC A15/MF A02

EPA/ROD/R09-90/046
Superfund Record of Decision (EPA Region 9): Watkins-Johnson (Stewart Division), Scotts Valley, California (First Remedial Action), Final Report, June 29, 1990.
PB91-921411/REB 91-01 PC A03/MF A01

EPA/ROD/R09-90/047
Superfund Record of Decision (EPA Region 9): J. H. Baxter Superfund Site, Weed, CA. (First Remedial Action), September 1990.
PB91-921489/REB 91-04 PC A10/MF A03

EPA/ROD/R09-90/048
Superfund Record of Decision (EPA Region 9): Stringfellow Hazardous Waste Site, Riverside County, CA. (Fourth Remedial Action), September 1990.
PB91-921490/REB 91-04 PC A03/MF A01

EPA/ROD/R09-90/049
Superfund Record of Decision (EPA Region 9): Coalinga Asbestos Mine, Fresno County, CA. (Second Remedial Action), September 1990.
PB91-921523/REB 91-04 PC A04/MF A01

EPA/ROD/R09-90/050
Superfund Record of Decision (EPA Region 9): Solvent Service Superfund Site, San Jose, CA. (First Remedial Action), September 1990.
PB91-921544/REB 91-04 PC A07/MF A02

EPA/ROD/R09-90/052
Superfund Record of Decision (EPA Region 9): Intersil/Siemens Superfund Site, Cupertino, CA. (First Remedial Action), September 1990.
PB91-921535/REB 91-04 PC A06/MF A02

EPA/ROD/R09-90/053
Superfund Record of Decision (EPA Region 9): Louisiana-Pacific Corporation, Oroville, CA. (First Remedial Action), September 1990.
PB91-921491/REB 91-04 PC A05/MF A01

EPA/ROD/R09-90/054
Superfund Record of Decision (EPA Region 9): Applied Materials, Inc., Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921492/REB 91-04 PC A05/MF A01

EPA/ROD/R09-90/055
Superfund Record of Decision (EPA Region 9): Operating Industries, Inc., Monterey Park, CA. (Third Remedial Action), September 1990 (Amendment).
PB91-921493/REB 91-04 PC A03/MF A01
Superfund Record of Decision (EPA Region 9): Intel Santa Clara III Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921534/REB 91-04 PC A06/MF A02

EPA/ROD/R10-90/021
Superfund Record of Decision (EPA Region 10): Teledyne Wah Chang, Albany, OR. (First Remedial Action), December 1989.
PB91-921414/REB 91-01 PC A04/MF A01

EPA/ROD/R10-90/024
Superfund Record of Decision (EPA Region 10): FMC Pesticide Formulation Facility, Yakima, WA. (First Remedial Action), September 1990.
PB91-921494/REB 91-04 PC A04/MF A01

EPA/ROD/R10-90/025
Superfund Record of Decision (EPA Region 10): Fort Lewis Logistics Center, Pierce County, Fort Lewis, WA. (First Remedial Action), September 1990.
PB91-921542/REB 91-04 PC A04/MF A01

EPA/SW/DK-91/074
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PB91-506469/REB 91-01 CP D02

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Characterization of Environmental Tobacco Smoke.
PB91-242495/REB 91-04 PC **A02/MF A01**

PB91-242503/REB
Passive Smoking on Commercial Airline Flights.
PB91-242503/REB 91-04 PC **A02/MF A01**

PB91-242511/REB
Bioassay-Directed Fractionation of the Organic Extract of SRM 1649 Urban Air Particulate Matter.
PB91-242511/REB 91-04 PC **A03/MF A01**

PB91-242529/REB
Urban Aerosol Acids: Analysis of National Institute of Standards and Technology Standard Reference Material 1649.
PB91-242529/REB 91-04 PC **A03**/MF **A01**

PB91-242537/REB
Bioassay-Directed Fractionation of 1-Nitropyrene Metabolites: Generation of Mutagrams by Coupling Reverse-Phase HPLC with Microsuspension Mutagenicity Assays.
PB91-242537/REB 91-04 PC **A03**/MF **A01**

PB91-242545/REB
Comparing Simulated and Experimental Hysteretic Two-Phase Transient Fluid Flow Phenomena.
PB91-242545/REB 91-04 PC **A03**/MF **A01**

PB91-242552/REB
Effect of Satellite Lines from the X-ray Source on X-ray Diffraction Peaks.
PB91-242552/REB 91-04 PC **A02**/MF **A01**

PB91-242560/REB
Association of Microorganisms with Surfaces in Distribution Systems.
PB91-242560/REB 91-04 PC **A02**/MF **A01**

PB91-242578/REB
Distribution, Clearance, and Mortality of Environmental Pseudomonads in Mice upon Intranasal Exposure.
PB91-242578/REB 91-04 PC **A02**/MF **A01**

PB91-242586/REB
Diethyldithiocarbamate Potentiates the Neurotoxicity of In vivo 1-Methyl-4-Phenyl-1,2,3,6-Tetrahydropyridine and of In vitro 1-Methyl-4-Phenylpyridinium.
PB91-242586/REB 91-04 PC **A03**/MF **A01**

PB91-242594/REB
Retrograde Axonal Transport of Locally Synthesized Phosphoinositides in the Rat Sciatic Nerve.
PB91-242594/REB 91-04 PC **A02**/MF **A01**

PB91-242602/REB
Phosphine-Mediated Heinz Body Formation and Hemoglobin Oxidation in Human Erythrocytes.
PB91-242602/REB 91-04 PC **A02**/MF **A01**

PB91-242610/REB
Role of Hyperplastic Nodules in Dichloroacetic Acid-Induced Hepatocarcinogenesis in B6C3F1 Male Mice.
PB91-242610/REB 91-04 PC **A02**/MF **A01**

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Glutamate Neurotoxicity in Rat Auditory System: Cochlear Nuclear Complex.
PB91-242628/REB 91-04 PC **A02**/MF **A01**

PB91-242925/REB
Modeling the Influence of Active Subslab Depressurization (ASD) Systems on Airflows in Subslab Aggregate Beds.
PB91-242925/REB 91-04 PC **A03**/MF **A01**

PB91-242933/REB
Characterization of Emissions from an Early Model FFV.
PB91-242933/REB 91-04 PC **A03**/MF **A01**

PB91-242941/REB
Local and Global Thermoregulatory Responses to MRI Electromagnetic Fields: Biological Effects and Safety Aspects of Nuclear Magnetic Resonance Imaging and Spectroscopy.
PB91-242941/REB 91-04 PC **A03**/MF **A01**

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Update on Radon Mitigation Research in Schools.
PB91-242958/REB 91-04 PC **A03**/MF **A01**

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Effect of Ventilation on Emission Rates of Wood Finishing Materials.
PB91-242966/REB 91-04 PC **A02**/MF **A01**

PB91-242974/REB
Emission of Organic Substances from Indoor Surface Materials.
PB91-242974/REB 91-04 PC **A02**/MF **A01**

PB91-242982/REB
Study to Characterize Indoor Particles in Three Non-Smoking Homes.
PB91-242982/REB 91-04 PC **A03**/MF **A01**

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Expert System for Estimates of Molecular Weights of Volatile Organic Compounds from Low-Resolution Mass Spectra.
PB91-242990/REB 91-04 PC **A03**/MF **A01**

PB91-243006/REB
Wintertime Measurements of Aerosol Acidity and Trace Elements in Wuhan, a City in Central China.
PB91-243006/REB 91-04 PC **A02**/MF **A01**

PB91-243014/REB
Age-Related Changes in Receptor-Mediated Phosphoinositide Hydrolysis in Various Regions of Rat Brain.
PB91-243014/REB 91-04 PC **A02**/MF **A01**

PB91-243022/REB
Pargyline and gamma-Butyrolactone Enhance Tyrosine Hydroxylase Immunostaining of Nigrostriatal Axons.
PB91-243022/REB 91-04 PC **A02**/MF **A01**

PB91-243030/REB
Glucocorticoids Regulate the Synthesis of Glial Fibrillary Acidic Protein in Intact and Adrenalectomized Rats but Do Not Affect Its Expression Following Brain Injury.
PB91-243030/REB 91-04 PC **A03**/MF **A01**

PB91-243048/REB
Genotoxicity of 2-Amino-6-N-Hydroxyadenine (AHA) to Mouse Lymphoma and CHO Cells.
PB91-243048/REB 91-04 PC **A03**/MF **A01**

PB91-243055/REB
Formation of Mutagenic Urinary Metabolites from 1-Nitropyrene in Germ-Free and Conventional Rats: Role of the Gut Flora.
PB91-243055/REB 91-04 PC **A02**/MF **A01**

PB91-243386/REB
Development of Ozone Reactivity Scales for Volatile Organic Compounds.
PB91-243386/REB 91-04 PC **A07**/MF **A02**

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NAPAP Emissions Inventory (Version 2): U.S. Point Source Modelers' Inventory, 1985.
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NAPAP Emissions Inventory (Version 2): Canadian Modelers' Point Source Data, 1985.
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PB91-505602/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tape - Winter Weekday, 1985.
PB91-505602/REB 91-01 CP **T03**

PB91-505610/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tape - Winter Weekday, 1985.
PB91-505610/REB 91-01 CP **T03**

PB91-505628/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Winter Weekday, 1985.
PB91-505628/REB 91-01 CP **T02**

PB91-505636/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tapes - Winter Weekday, 1985.
PB91-505636/REB 91-01 CP **T02**

PB91-505644/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Winter Saturday, 1985.
PB91-505644/REB 91-01 CP **T03**

PB91-505651/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Modelers' Tape - Winter Saturday, 1985.
PB91-505651/REB 91-01 CP **T03**

PB91-505669/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Winter Saturday, 1985.
PB91-505669/REB 91-01 CP **T02**

PB91-505677/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Winter Saturday, 1985.
PB91-505677/REB 91-01 CP **T02**

PB91-505685/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tape, 1985.
PB91-505685/REB 91-01 CP **T03**

PB91-505693/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Winter Sunday, 1985.
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PB91-505701/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Winter Sunday, 1985.
PB91-505701/REB 91-01 CP **T02**

PB91-505719/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Winter Sunday, 1985.
PB91-505719/REB 91-01 CP **T02**

PB91-505727/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Fall Weekday, 1985.
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PB91-505735/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Fall Saturday, 1985.
PB91-505735/REB 91-01 CP **T03**

PB91-505743/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tape - Fall Saturday, 1985.
PB91-505743/REB 91-01 CP **T03**

PB91-505750/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Fall Saturday, 1985.
PB91-505750/REB 91-01 CP **T02**

PB91-505768/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Fall Saturday, 1985.
PB91-505768/REB 91-01 CP **T02**

PB91-505776/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Fall Sunday, 1985.
PB91-505776/REB 91-01 CP **T03**

PB91-505784/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tape - Fall Sunday, 1985.
PB91-505784/REB 91-01 CP **T03**

PB91-505792/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Fall Sunday, 1985.
PB91-505792/REB 91-01 CP **T02**

PB91-505800/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Fall Sunday, 1985.
PB91-505800/REB 91-01 CP **T02**

PB91-505818/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Winter Weekday, 1985.
PB91-505818/REB 91-01 CP **T02**

PB91-505826/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Winter Saturday, 1985.
PB91-505826/REB 91-01 CP **T02**

PB91-505834/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Winter Sunday, 1985.
PB91-505834/REB 91-01 CP **T02**

PB91-505842/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Spring Weekday, 1985.
PB91-505842/REB 91-01 CP **T02**

PB91-505859/REB
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PB91-505859/REB 91-01 CP **T02**

PB91-505867/REB
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PB91-505867/REB 91-01 CP **T02**

PB91-505875/REB
NAPAP Annual Emissions Inventory (Version 2): U.S. Annual Area Sources, 1985.
PB91-505875/REB 91-01 CP **T02**

PB91-505883/REB
NAPAP Emissions Inventory (Version 2): Canadian Annual Area Sources, 1985.
PB91-505883/REB 91-01 CP **T02**

PB91-505891/REB
NAPAP Emissions Inventory (Version 2): U.S. Annual Natural Particulate Sources, 1985.
PB91-505891/REB 91-01 CP **T02**

PB91-505909/REB
NAPAP Emissions Inventory (Version 2): Canadian Annual Natural Particulate Sources, 1985.
PB91-505909/REB 91-01 CP **T02**

PB91-505917/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Spring Weekday, 1985.
PB91-505917/REB 91-01 CP **T03**

PB91-505925/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tape - Spring Weekday, 1985.
PB91-505925/REB 91-01 CP **T03**

PB91-505933/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Spring Weekday, 1985.
PB91-505933/REB 91-01 CP **T02**

PB91-505941/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Spring Weekday, 1985.
PB91-505941/REB 91-01 CP **T02**

PB91-505958/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Spring Saturday, 1985.
PB91-505958/REB 91-01 CP **T03**

PB91-505966/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Spring Saturday, 1985.
PB91-505966/REB 91-01 CP **T03**

PB91-505974/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Spring Saturday, 1985.
PB91-505974/REB 91-01 CP **T02**

PB91-505982/REB
NAPAP Emissions Enventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Spring Saturday, 1985.
PB91-505982/REB 91-01 CP T02

PB91-505990/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Spring Sunday, 1985.
PB91-505990/REB 91-01 CP T03

PB91-506006/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Spring Sunday, 1985.
PB91-506006/REB 91-01 CP T03

PB91-506014/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Spring Sunday, 1985.
PB91-506014/REB 91-01 CP T02

PB91-506022/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Nonmobile Sources Modelers' Tape - Spring Sunday, 1985.
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PB91-506030/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Summer Weekday, 1985.
PB91-506030/REB 91-01 CP T03

PB91-506048/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Summer Weekday, 1985.
PB91-506048/REB 91-01 CP T03

PB91-506055/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Source Modelers' Tape - Summer Weekday, 1985.
PB91-506055/REB 91-01 CP T02

PB91-506063/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Nonmobile Sources Modelers' Tape - Summer Weekday, 1985.
PB91-506063/REB 91-01 CP T02

PB91-506071/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Summer Saturday, 1985.
PB91-506071/REB 91-01 CP T03

PB91-506089/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Summer Saturday, 1985.
PB91-506089/REB 91-01 CP T03

PB91-506097/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Summer Saturday, 1985.
PB91-506097/REB 91-01 CP T02

PB91-506105/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Nonmobile Sources Modelers' Tape - Summer Saturday, 1985.
PB91-506105/REB 91-01 CP T02

PB91-506113/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers' Tapes - Summer Sunday, 1985.
PB91-506113/REB 91-01 CP T03

PB91-506121/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Summer Sunday, 1985.
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PB91-506139/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Summer Sunday, 1985.
PB91-506139/REB 91-01 CP T02

PB91-506147/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canadian TSP Nonmobile Sources Modelers' Tape - Summer Sunday, 1985.
PB91-506147/REB 91-01 CP T02

PB91-506154/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Mobile Sources Modelers; Tapes - Fall Weekday, 1985.
PB91-506154/REB 91-01 CP T03

PB91-506162/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada THC Nonmobile Sources Modelers' Tapes - Fall Weekday, 1985.
PB91-506162/REB 91-01 CP T03

PB91-506170/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada TSP Mobile Sources Modelers' Tape - Fall Weekday, 1985.
PB91-506170/REB 91-01 CP T02

PB91-506188/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Spring Saturday, 1985.
PB91-506188/REB 91-01 CP T02

PB91-506196/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Spring Sunday, 1985.
PB91-506196/REB 91-01 CP T02

PB91-506204/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Summer Weekday, 1985.
PB91-506204/REB 91-01 CP T02

PB91-506212/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Summer Saturday, 1985.
PB91-506212/REB 91-01 CP T02

PB91-506220/REB
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PB91-506220/REB 91-01 CP T02

PB91-506238/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Fall Weekday, 1985.
PB91-506238/REB 91-01 CP T02

PB91-506246/REB
NAPAP Emissions Inventory (Version 2): U.S. and Canada Natural Particulate Sources Modelers' Tape - Fall Saturday, 1985.
PB91-506246/REB 91-01 CP T02

PB91-506253/REB
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PB91-506253/REB 91-01 CP T02

PB91-506295/REB
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PB91-506295/REB 91-01 CP D02

PB91-506469/REB
Integrated Air Pollution Control System (IAPCS), Executable Model (Version 4.0) (for Microcomputers).
PB91-506469/REB 91-01 CP D02

PB91-506477/REB
Integrated Air Pollution Control System (IAPCS), Executable Model and Source Model (Version 4.0) (for Microcomputers).
PB91-506477/REB 91-01 CP D03

PB91-506816/REB
Toxic Release Inventory (TRI), 1988: Reporting Facilities Names and Addresses.
PB91-506816/REB 91-01 CP T02

PB91-506964/REB
Consolidated List of Chemical Subject to Reporting under the Emergency Planning and Community Right to Know Act: SARA Section 302 Extremely Hazardous Substances, CERCLA Hazardous Substances and SARA Section 313 Toxic Chemicals (Title III, List of Lists) (for Microcomputers).
PB91-506964/REB 91-01 CP D02

PB91-506998/REB
Surface Impoundment Modeling System, Version 2.0 (for Microcomputers).
PB91-506998/REB 91-01 CP D02

PB91-507137/REB
Fate Model Program, Version 1.0 (for Microcomputers).
PB91-507137/REB 91-01 CP D01

PB91-507236/REB
Fate and Treatability Estimator (FATE) Model (for Microcomputers).
PB91-507236/REB 91-04 CP D03

PB91-507301/REB
Toxic Substances Control Act Chemical Substances Inventory: Revised Inventory Synonym and Preferred Name File, January 1991.
PB91-507301/REB 91-01 CP T05

PB91-507319/REB
Commenced PMN Case Number Cross-Reference File to Chemical Abstracts Registry Number or Accession Number, January 1991.
PB91-507319/REB 91-01 CP T02

PB91-507376/REB
OZIPR: Ozone Isopleth Plotting Package (Research Version) (for Microcomputers).
PB91-507376/REB 91-01 CP D03

PB91-507509/REB
Toxic Release Inventory (TRI), 1989.
PB91-507509/REB 91-01 CP T14

PB91-507541/REB
Landfill Air Emissions Estimation Model, Version 1.1 (for Microcomputers).
PB91-507541/REB 91-01 CP D02

PB91-507749/REB
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PB91-507749/REB 91-04 CP D04

PB91-507756/REB
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PB91-507756/REB 91-04 CP D03

PB91-507764/REB
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PB91-507764/REB 91-04 CP D03

PB91-507871/REB
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PB91-507871/REB 91-04 CP D03

PB91-507889/REB
Crosswalk/Air Toxic Emission Factor Data Base Management System (Version 1.13) (for Microcomputers).
PB91-507889/REB 91-04 CP D02

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PB91-508580/REB
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PB91-508598/REB 91-04 CP D01

PB91-508606/REB
Toxic Release Inventory (TRI), American Samoa, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508606/REB 91-04 CP D01

PB91-508614/REB
Toxic Release Inventory (TRI), Arizona, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508614/REB 91-04 CP D01

PB91-508622/REB
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PB91-508622/REB 91-04 CP D01

PB91-508630/REB
Toxic Release Inventory (TRI), California, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508630/REB 91-04 CP D01

PB91-508648/REB
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PB91-508648/REB 91-04 CP D01

PB91-508655/REB
Toxic Release Inventory (TRI), Colorado, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508655/REB 91-04 CP D01

PB91-508663/REB
Toxic Release Inventory (TRI), Florida, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508663/REB 91-04 CP D01

PB91-508671/REB
Toxic Release Inventory (TRI), Georgia, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508671/REB 91-04 CP D01

PB91-508689/REB
Toxic Release Inventory (TRI), Hawaii, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508689/REB 91-04 CP D01

PB91-508697/REB
Toxic Release Inventory (TRI), Idaho, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508697/REB 91-04 CP D01

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PB91-508705/REB 91-04 CP D01

PB91-508713/REB
Toxic Release Inventory (TRI), Indiana, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508713/REB 91-04 CP D01

PB91-508721/REB
Toxic Release Inventory (TRI), Iowa, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508721/REB 91-04 CP D01

PB91-508739/REB
Toxic Release Inventory (TRI), Kansas, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508739/REB 91-04 CP D01

PB91-508747/REB
Toxic Release Inventory (TRI), Kentucky, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508747/REB 91-04 CP D01

PB91-508754/REB
Toxic Release Inventory (TRI), Louisiana, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508754/REB 91-04 CP D01

PB91-508762/REB
Toxic Release Inventory (TRI), Maine, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508762/REB 91-04 CP D01

PB91-508770/REB
Toxic Release Inventory (TRI), Maryland, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508770/REB 91-04 CP D01

PB91-508788/REB
Toxic Release Inventory (TRI), Massachusetts, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508788/REB 91-04 CP **D01**

PB91-508796/REB
Toxic Release Inventory (TRI), Michigan, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508796/REB 91-04 CP **D01**

PB91-508804/REB
Toxic Release Inventory (TRI), Minnesota, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508804/REB 91-04 CP **D01**

PB91-508812/REB
Toxic Release Inventory (TRI), Mississippi, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508812/REB 91-04 CP **D01**

PB91-508820/REB
Toxic Release Inventory (TRI), Missouri, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508820/REB 91-04 CP **D01**

PB91-508838/REB
Toxic Release Inventory (TRI), Montana, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508838/REB 91-04 CP **D01**

PB91-508846/REB
Toxic Release Inventory (TRI), Nebraska, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508846/REB 91-04 CP **D01**

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Toxic Release Inventory (TRI), Nevada, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508853/REB 91-04 CP **D01**

PB91-508861/REB
Toxic Release Inventory (TRI), New Hampshire, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
PB91-508861/REB 91-04 CP **D01**

PB91-508879/REB
Toxic Release Inventory (TRI), New Jersey, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), New Mexico, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), New York, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), North Carolina, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Ohio, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Oklahoma, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Oregon, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Pennsylvania, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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PB91-508960/REB
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Toxic Release Inventory (TRI), Rhode Island (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), South Carolina, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Tennessee, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Texas, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Utah, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Vermont, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Virginia, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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PB91-509059/REB
Toxic Release Inventory (TRI), Virgin Islands, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Washington, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Wyoming, 1989 (in dBase and Lotus 1-2-3 Format) (for Microcomputers).
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Toxic Release Inventory (TRI), United States and Territories, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Alabama, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Alaska, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), American Samoa, 1989 (in Macintosh Excel Format) (for Microcomputers).
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PB91-509166/REB
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Toxic Release Inventory (TRI), Delaware, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Colorado, 1989 (in Macintosh Excel Format) (for Microcomputers).
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PB91-509190/REB
Toxic Release Inventory (TRI), Florida, 1989 (in Macintosh Excel Format) (for Microcomputers).
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PB91-509208/REB
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Toxic Release Inventory (TRI), Idaho, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Indiana, 1989 (in Macintosh Excel Format) (for Microcomputers).
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PB91-509257/REB
Toxic Release Inventory (TRI), Iowa, 1989 (in Macintosh Excel Format) (for Microcomputers).
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PB91-509265/REB
Toxic Release Inventory (TRI), Kansas, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Kentucky, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Louisiana, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Maine, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Maryland, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Massachusetts, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Mississippi, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Missouri, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Montana, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Nebraska, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Nevada, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), New Hampshire, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), New Jersey, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), New Mexico, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), New York, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), North Carolina, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), North Dakota, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Ohio, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Oklahoma, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Oregon, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Pennsylvania, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Puerto Rico, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Rhode Island, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), South Carolina, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), South Dakota, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Tennessee, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Texas, 1989 (in Macintosh Excel Format) (for Microcomputers).
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PB91-509554/REB
Toxic Release Inventory (TRI), Utah, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Vermont, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Virginia, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Virgin Islands, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Washington, 1989 (in Macintosh Excel Format) (for Microcomputers).
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PB91-509604/REB
Toxic Release Inventory (TRI), West Virginia, 1989 (in Macintosh Excel Format) (for Microcomputers).
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Toxic Release Inventory (TRI), Wisconsin, 1989 (in Macintosh Excel Format) (for Microcomputers).
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PB91-921430/REB 91-04 PC **A05**/MF **A01**

PB91-921431/REB
Superfund Record of Decision (EPA Region 2): Montclair/West Orange Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921431/REB 91-04 PC **A04**/MF **A01**

PB91-921432/REB
Superfund Record of Decision (EPA Region 3): Avtex Fibers Site, Front Royal, VA. (Second Remedial Action), September 1990.
PB91-921432/REB 91-04 PC **A04**/MF **A01**

PB91-921433/REB
Superfund Record of Decision (EPA Region 3): Fike/Artel Chemical Site, Nitro, WV. (Second Remedial Action), September 1990.
PB91-921433/REB 91-04 PC **A03**/MF **A01**

PB91-921434/REB
Superfund Record of Decision (EPA Region 3): Keystone Sanitation Landfill Site, Adams County, Union Township, PA. (First Remedial Action), September 1990.
PB91-921434/REB 91-04 PC **A07**/MF **A01**

PB91-921435/REB
Superfund Record of Decision (EPA Region 3): Croyden TCE Site, Bristol Township, Bucks County, PA. (Second Remedial Action), June 1990.
PB91-921435/REB 91-04 PC **A07**/MF **A01**

PB91-921436/REB
Superfund Record of Decision (EPA Region 2): Glen Ridge Radium Site, Essex County, NJ. (Second Remedial Action), June 1990.
PB91-921436/REB 91-04 PC **A04**/MF **A01**

PB91-921437/REB
Superfund Record of Decision (EPA Region 3): Brown's Battery Breaking Site, Tilden Township, PA. (First Remedial Action), September 1990.
PB91-921437/REB 91-04 PC **A05**/MF **A01**

PB91-921438/REB
Superfund Record of Decision (EPA Region 3): Butz Landfill Superfund Site, Jackson Township, Monroe County, PA. (First Remedial Action), September 1990.
PB91-921438/REB 91-04 PC **A03**/MF **A01**

PB91-921439/REB
Superfund Record of Decision (EPA Region 3): Sand, Gravel and Stone Site, Elkton, MD. (Second Remedial Action), September 1990.
PB91-921439/REB 91-04 PC **A05**/MF **A01**

PB91-921440/REB
Superfund Record of Decision (EPA Region 3): Osborne Landfill Site, Pine Township, Mercer County, PA. (First Remedial Action), September 1990.
PB91-921440/REB 91-04 PC **A09**/MF **A01**

PB91-921441/REB
Superfund Record of Decision (EPA Region 3): East Mt. Zion Landfill, Springettsbury Township, York County, PA. (First Remedial Action), September 1990.
PB91-921441/REB 91-04 PC **A05**/MF **A01**

PB91-921442/REB
Superfund Record of Decision (EPA Region 4): Harris/Palm Bay Facility, Palm Bay, Brevard County, FL. (First Remedial Action), June 1990.
PB91-921442/REB 91-04 PC **A06**/MF **A01**

PB91-921443/REB
Superfund Record of Decision (EPA Region 4): North Hollywood Dump, TN. (First Remedial Action), September 1990.
PB91-921443/REB 91-04 PC **A13**/MF **A02**

PB91-921444/REB
Superfund Record of Decision (EPA Region 4): Dubose Oil Products Site, Cantonment, Escambia County, FL. (First Remedial Action), March 1990.
PB91-921444/REB 91-04 PC **A04**/MF **A01**

PB91-921445/REB
Superfund Record of Decision (EPA Region 4): Kassouf-Kimerling Battery Site, Tampa, Hillsborough County, FL. (Second Remedial Action), March 1990.
PB91-921445/REB 91-04 PC **A04**/MF **A01**

PB91-921446/REB
Superfund Record of Decision (EPA Region 4): National Starch and Chemical Corporation Site, Salisbury, NC. (Second Remedial Action), September 1990.
PB91-921446/REB 91-04 PC **A08**/MF **A02**

PB91-921447/REB
Superfund Record of Decision (EPA Region 4): SCRDI Bluff Road Site, Columbia, Richland County, SC. (First Remedial Action), September 1990.
PB91-921447/REB 91-04 PC **A06**/MF **A02**

PB91-921448/REB
Superfund Record of Decision (EPA Region 4): Pickettville Road Landfill, Jacksonville, Duval County, FL. (First Remedial Action), September 1990.
PB91-921448/REB 91-04 PC **A05**/MF **A01**

PB91-921449/REB
Superfund Record of Decision (EPA Region 4): Cabot Carbon/Koppers Site, Gainesville, Alachua County, FL. (First Remedial Action), September 1990.
PB91-921449/REB 91-04 PC **A07**/MF **A01**

PB91-921450/REB
Superfund Record of Decision (EPA Region 5): Tri-State Plating, Columbus, IN. (First Remedial Action), March 1990.
PB91-921450/REB 91-04 PC **A03**/MF **A01**

PB91-921451/REB
Superfund Record of Decision (EPA Region 5): Fisher-Calo Chem, Kingsbury, IN. (First Remedial Action), August 1990.
PB91-921451/REB 91-04 PC **A05**/MF **A01**

PB91-921452/REB
Superfund Record of Decision (EPA Region 5): Wheeler Pit Site, La Prairie Township, WI. (First Remedial Action), September 1990.
PB91-921452/REB 91-04 PC **A05**/MF **A01**

PB91-921453/REB
Superfund Record of Decision (EPA Region 5): Pristine, Inc., Reading, OH. (First Remedial Action), March 1990. (Amendment).
PB91-921453/REB 91-04 PC **A03**/MF **A01**

PB91-921454/REB
Superfund Record of Decision (EPA Region 5): K and L Landfill, Kalamazoo, MI. (First Remedial Action), September 1990.
PB91-921454/REB 91-04 PC **A02**/MF **A01**

PB91-921455/REB
Superfund Record of Decision (EPA Region 5): Ott/Story/Cordova Chemical Site, North Muskegon, MI. (Second Remedial Action), September 1990.
PB91-921455/REB 91-04 PC **A05**/MF **A02**

PB91-921456/REB
Superfund Record of Decision (EPA Region 5): Naval Industrial Reserve Ordnance Plant, Fridley, MN. (First Remedial Action), September 1990.
PB91-921456/REB 91-04 PC **A04**/MF **A01**

PB91-921457/REB
Superfund Record of Decision (EPA Region 5): National Presto Industries, Eau Claire, WI. (First Remedial Action), August 1990.
PB91-921457/REB 91-04 PC **A05**/MF **A01**

PB91-921458/REB
Superfund Record of Decision (EPA Region 5): St. Louis River/Interlake/Duluth Tar Site, Duluth, MN. (First Remedial Action), September 1990.
PB91-921458/REB 91-04 PC **A04**/MF **A01**

PB91-921459/REB
Superfund Record of Decision (EPA Region 5): Clare Water Supply, Clare County, MI. (First Remedial Action), August 1990.
PB91-921459/REB 91-04 PC **A03**/MF **A01**

PB91-921460/REB
Superfund Record of Decision (EPA Region 5): University of Minnesota Rosemount Research Center, MN. (First Remedial Action), June 1990.
PB91-921460/REB 91-04 PC **A07**/MF **A02**

PB91-921461/REB
Superfund Record of Decision (EPA Region 5): Moss-American Kerr-McGee Oil Site, Milwaukee, WI. (First Remedial Action), September 1990.
PB91-921461/REB 91-04 PC **A06**/MF **A02**

PB91-921462/REB
Superfund Record of Decision (EPA Region 5): Springfield Township Dump Site, Oakland County, MI. (First Remedial Action), September 1990.
PB91-921462/REB 91-04 PC **A07**/MF **A02**

PB91-921463/REB
Superfund Record of Decision (EPA Region 5): Metamora Landfill, Metamora, Lapeer County, MI. (Second Remedial Action), September 1990.
PB91-921463/REB 91-04 PC **A04**/MF **A01**

PB91-921464/REB
Superfund Record of Decision (EPA Region 5): Hunts Disposal Landfill Site, Town of Caledonia, WI. (First Remedial Action), September 1990.
PB91-921464/REB 91-04 PC **A05**/MF **A01**

PB91-921465/REB
Superfund Record of Decision (EPA Region 5): Union Scrap Iron Metal, Hennepin County, Minneapolis, MN. (First Remedial Action), March 1990.
PB91-921465/REB 91-04 PC **A03**/MF **A01**

PB91-921466/REB
Superfund Record of Decision (EPA Region 5): Bofors-Nobel Site, Muskegon, MI. (First Remedial Action), September 1990.
PB91-921466/REB 91-04 PC **A05**/MF **A01**

PB91-921467/REB
Superfund Record of Decision (EPA Region 6): Jacksonville Municipal Landfill Superfund Site, AR. (First Remedial Action), September 1990.
PB91-921467/REB 91-04 PC **A09**/MF **A02**

PB91-921468/REB
Superfund Record of Decision (EPA Region 6): Texarkana Wood Preserving Company, Texarkana, Bowie County, TX. (First Remedial Action), September 1990.
PB91-921468/REB 91-04 PC **A05**/MF **A01**

PB91-921469/REB
Superfund Record of Decision (EPA Region 6): Tenth Street Dump/Junkyard, Oklahoma City, OK. (First Remedial Action), September 1990.
PB91-921469/REB 91-04 PC **A05**/MF **A01**

PB91-921470/REB
Superfund Record of Decision (EPA Region 6): Tinker AFB (Soldier Creek/Bldg. 3001), OK. (First Remedial Action), August 1990.
PB91-921470/REB 91-04 PC **A08**/MF **A02**

PB91-921471/REB
Superfund Record of Decision (EPA Region 7): Northwestern States Portland Cement Company Site, Mason City, IA. (First Remedial Action), June 1990.
PB91-921471/REB 91-04 PC **A03**/MF **A01**

PB91-921472/REB
Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination (East Industrial Park), NE (First Remedial Action), September 1990.
PB91-921472/REB 91-04 PC **A06**/MF **A02**

PB91-921473/REB
Superfund Record of Decision (EPA Region 7): Hastings Ground Water Contamination FAR-MAR-CO Subsite, Hastings Irrigation Pipe Company TCA Soils Operable Unit, Hastings, NE. (Second Remedial Action), September 1990.
PB91-921473/REB 91-04 PC **A03**/MF **A01**

PB91-921474/REB
Superfund Record of Decision (EPA Region 7): Lindsay Manufacturing Company, Lindsay, NE. (First Remedial Action), September 1990.
PB91-921474/REB 91-04 PC **A04**/MF **A01**

PB91-921475/REB
Superfund Record of Decision (EPA Region 7): Midwest Manufacturing/North Farm Site, Midwest Operable Unit, Kellogg, IA. (First Remedial Action), September 1990.
PB91-921475/REB 91-04 PC **A05**/MF **A01**

PB91-921476/REB
Superfund Record of Decision (EPA Region 7): Missouri Electric Works Site, Cape Girardeau, MO. (First Remedial Action), September 1990.
PB91-921476/REB 91-04 PC **A05**/MF **A02**

PB91-921477/REB
Superfund Record of Decision (EPA Region 7): Waverly Ground Water Contamination Site, Waverly, NE. (First Remedial Action), September 1990.
PB91-921477/REB 91-04 PC **A03**/MF **A01**

PB91-921478/REB
Superfund Record of Decision (EPA Region 7): Fairfield Coal Gasification Site, Fairfield, IA. (First Remedial Action), September 1990.
PB91-921478/REB 91-04 PC **A05**/MF **A01**

PB91-921479/REB
Superfund Record of Decision (EPA Region 8): Sand Creek Industrial Site, Commerce City, CO. (Second Remedial Action), September 1990.
PB91-921479/REB 91-04 PC **A05**/MF **A01**

PB91-921480/REB
Superfund Record of Decision (EPA Region 8): Ogden Defense Depot (Operable Unit 2), Weber County, Ogden, UT. (First Remedial Action), September 1990.
PB91-921480/REB 91-04 PC **A04**/MF **A01**

PB91-921481/REB
Superfund Record of Decision (EPA Region 8): Mystery Bridge at Highway 20, Natrona County, WY. (First Remedial Action), September 1990.
PB91-921481/REB 91-04 PC **A06**/MF **A02**

PB91-921482/REB
Superfund Record of Decision (EPA Region 8): Monticello Mill Tailings Site, San Juan County, UT. (First Remedial Action), August 1990.
PB91-921482/REB 91-04 PC **A05**/MF **A01**

PB91-921483/REB
Superfund Record of Decision (EPA Region 8): Martin Marietta Astronautics Group Site, Waterton, CO. (First Remedial Action), September 1990.
PB91-921483/REB 91-04 PC **A08**/MF **A02**

PB91-921484/REB
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 16), CO. (Second Remedial Action), February 1990.
PB91-921484/REB 91-04 PC **A04**/MF **A01**

PB91-921485/REB
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 18), CO. (Third Remedial Action), February 1990.
PB91-921485/REB 91-04 PC **A05**/MF **A01**

PB91-921486/REB
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 20), CO. (Fifth Remedial Action), March 1990.
PB91-921486/REB 91-04 PC **A04**/MF **A01**

PB91-921487/REB
Superfund Record of Decision (EPA Region 8): Rocky Flats Plant (DOE), Northern Jefferson County, CO. (First Remedial Action), January 1990.
PB91-921487/REB 91-04 PC **A19**/MF **A04**

PB91-921488/REB
Superfund Record of Decision (EPA Region 8): Sharon Steel (Midvale Tailings), Midvale, UT. (First Remedial Action), September 1990.
PB91-921488/REB 91-04 PC **A06**/MF **A02**

PB91-921489/REB
Superfund Record of Decision (EPA Region 9): J. H. Baxter Superfund Site, Weed, CA. (First Remedial Action), September 1990.
PB91-921489/REB 91-04 PC **A10**/MF **A03**

PB91-921490/REB
Superfund Record of Decision (EPA Region 9): Stringfellow Hazardous Waste Site, Riverside County, CA. (Fourth Remedial Action), September 1990.
PB91-921490/REB 91-04 PC **A03**/MF **A01**

PB91-921491/REB
Superfund Record of Decision (EPA Region 9): Louisiana-Pacific Corporation, Oroville, CA. (First Remedial Action), September 1990.
PB91-921491/REB 91-04 PC **A05**/MF **A01**

PB91-921492/REB
Superfund Record of Decision (EPA Region 9): Applied Materials, Inc., Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921492/REB 91-04 PC **A05**/MF **A01**

PB91-921493/REB
Superfund Record of Decision (EPA Region 9): Operating Industries, Inc., Monterey Park, CA. (Third Remedial Action), September 1990 (Amendment).
PB91-921493/REB 91-04 PC **A03**/MF **A01**

PB91-921494/REB
Superfund Record of Decision (EPA Region 10): FMC Pesticide Formulation Facility, Yakima, WA. (First Remedial Action), September 1990.
PB91-921494/REB 91-04 PC **A04**/MF **A01**

PB91-921495/REB
Superfund Record of Decision (EPA Region 2): Mannheim Avenue Dump Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921495/REB 91-04 PC **A06**/MF **A02**

PB91-921496/REB
Superfund Record of Decision (EPA Region 2): Higgins Farm, Franklin Township, Somerset County, NJ. (First Remedial Action), September 1990.
PB91-921496/REB 91-04 PC **A03**/MF **A01**

PB91-921497/REB
Superfund Record of Decision (EPA Region 2): Pomona Oaks Well Contamination Site, Galloway Township, Atlantic County, NJ. (First Remedial Action), September 1990.
PB91-921497/REB 91-04 PC **A05**/MF **A01**

PB91-921498/REB
Superfund Record of Decision (EPA Region 2): Imperial Oil/Champion Chemicals, Marlboro Township, Monmouth County, NJ. (First Remedial Action), September 1990.
PB91-921498/REB 91-04 PC **A04**/MF **A01**

PB91-921499/REB
Superfund Record of Decision (EPA Region 2): Vestal Water Supply Well No. 1-1, Broome County, Vestal, NY. (Second Remedial Action), September 1990.
PB91-921499/REB 91-04 PC **A06**/MF **A02**

PB91-921501/REB
Superfund Record of Decision (EPA Region 4): Schuylkill Metal, Hillsborough County, Plant City, FL. (First Remedial Action), September 1990.
PB91-921501/REB 91-04 PC **A06**/MF **A02**

PB91-921502/REB
Superfund Record of Decision (EPA Region 3): Cryo-Chem Site, Earl Township, Berks County, PA. (Second Remedial Action), September 1990.
PB91-921502/REB 91-04 PC **A06**/MF **A02**

PB91-921503/REB
Superfund Record of Decision (EPA Region 2): King of Prussia Technical Corporation Site, Winslow Township, Camden County, NJ. (First Remedial Action), September 1990.
PB91-921503/REB 91-04 PC **A08**/MF **A02**

PB91-921504/REB
Superfund Record of Decision (EPA Region 3): Raymark Site, Hatboro Borough, Montgomery County, PA. (First Remedial Action), September 1990.
PB91-921504/REB 91-04 PC **A08**/MF **A02**

PB91-921505/REB
Superfund Record of Decision (EPA Region 3): Dover Air Force Base, DE. (First Remedial Action), September 1990.
PB91-921505/REB 91-04 PC **A04**/MF **A01**

PB91-921506/REB
Superfund Record of Decision (EPA Region 4): Hipps Road Landfill Site, Duval County, Jacksonville, FL. (First Remedial Action), (Amendment), September 1990.
PB91-921506/REB 91-04 PC **A11**/MF **A03**

PB91-921507/REB
Superfund Record of Decision (EPA Region 4): 62nd Street Dump, Hillsborough County, Tampa, FL. (First Remedial Action), June 1990.
PB91-921507/REB 91-04 PC **A05**/MF **A01**

PB91-921508/REB
Superfund Record of Decision (EPA Region 4): Zellwood Groundwater Contamination Site, (Operable Unit 1), Orange County, Zellwood, FL. (First Remedial Action), (Amendment), March 1990.
PB91-921508/REB 91-04 PC **A04/MF A01**

PB91-921509/REB
Superfund Record of Decision (EPA Region 5): Sangamo/Crab Orchard National Wildlife Refuge (USDOI), Carterville, IL. (First Remedial Action), August 1990.
PB91-921509/REB 91-04 PC **A06/MF A02**

PB91-921510/REB
Superfund Record of Decision (EPA Region 6): Crystal Chemical Site, Houston, TX. (First Remedial Action), September 1990.
PB91-921510/REB 91-04 PC **A08/MF A02**

PB91-921511/REB
Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 19), CO. (Fourth Remedial Action), February 1990.
PB91-921511/REB 91-04 PC **A06/MF A02**

PB91-921512/REB
Superfund Record of Decision (EPA Region 8): Rocky Mt. Arsenal (Operable Unit 17), CO. (Eighth Remedial Action), February 1990.
PB91-921512/REB 91-04 PC **A05/MF A01**

PB91-921513/REB
Superfund Record of Decision (EPA Region 6): Vertac, Inc., Jacksonville, AR. (First Remedial Action), September 1990.
PB91-921513/REB 91-04 PC **A09/MF A02**

PB91-921514/REB
Superfund Record of Decision (EPA Region 7): White Farm Equipment Company Dump Site, Floyd County, Charles City, IA. (First Remedial Action), September 1990.
PB91-921514/REB 91-04 PC **A04/MF A01**

PB91-921515/REB
Superfund Record of Decision (EPA Region 5): NL Industries/Taracorp Lead Smelting, Granite City, IL. (First Remedial Action), March 1990.
PB91-921515/REB 91-04 PC **A09/MF A03**

PB91-921516/REB
Superfund Record of Decision (EPA Region 3): Tyson Dump Number 1, Upper Merion Township, Montgomery County, PA. (Third Remedial Action), September 1990.
PB91-921516/REB 91-04 PC **A04/MF A01**

PB91-921517/REB
Superfund Record of Decision (EPA Region 5): Oconomowoc Electroplating Company Site, Ashippun, WI. (First Remedial Action), September 1990.
PB91-921517/REB 91-04 PC **A05/MF A02**

PB91-921518/REB
Superfund Record of Decision (EPA Region 5): Algoma Municipal Landfill, Algoma, WI. (First Remedial Action), September 1990.
PB91-921518/REB 91-04 PC **A04/MF A01**

PB91-921519/REB
Superfund Record of Decision (EPA Region 5): Reilly Tar and Chemical Corporation Site, St. Peter Aquifer, St. Louis Park, MN. (Third Remedial Action), September 1990.
PB91-921519/REB 91-04 PC **A04/MF A01**

PB91-921520/REB
Superfund Record of Decision (EPA Region 6): Pagano Salvage Site, Los Lunas, NM. (First Remedial Action), September 1990.
PB91-921520/REB 91-04 PC **A03/MF A01**

PB91-921521/REB
Superfund Record of Decision (EPA Region 6): Arkwood, Inc., Omaha, AR. (First Remedial Action), September 1990.
PB91-921521/REB 91-04 PC **A06/MF A02**

PB91-921523/REB
Superfund Record of Decision (EPA Region 9): Coalinga Asbestos Mine, Fresno County, CA. (Second Remedial Action), September 1990.
PB91-921523/REB 91-04 PC **A04/MF A01**

PB91-921524/REB
Superfund Record of Decision (EPA Region 5): Master Disposal Service Landfill, Brookfield, WI. (First Remedial Action), September 1990.
PB91-921524/REB 91-04 PC **A04/MF A01**

PB91-921525/REB
Superfund Record of Decision (EPA Region 4): Munisport Landfill Site, Dade County, North Miami, FL. (First Remedial Action), July 1990.
PB91-921525/REB 91-04 PC **A09/MF A02**

PB91-921526/REB
Superfund Record of Decision (EPA Region 2): Claremont Polychemical, Nassau County, Old Bethpage, NY. (Second Remedial Action), September 1990.
PB91-921526/REB 91-04 PC **A07/MF A02**

PB91-921527/REB
Superfund Record of Decision (EPA Region 2): Metaltec/Aerosystems, Franklin Borough, Sussex County, NJ. (Second Remedial Action), September 1990.
PB91-921527/REB 91-04 PC **A05/MF A01**

PB91-921528/REB
Superfund Record of Decision (EPA Region 8): Silver Bow Creek/Butte Area NPL Site, Warm Springs Ponds Operable Unit, Upper Clark Fork River Basin, MT. (First Remedial Action), September 1990.
PB91-921528/REB 91-04 PC **A20/MF A04**

PB91-921529/REB
Superfund Record of Decision (EPA Region 2): Chemical Leaman Tank Lines Site, Logan Township, Gloucester County, NJ. (First Remedial Action), September 1990.
PB91-921529/REB 91-04 PC **A05/MF A01**

PB91-921530/REB
Superfund Record of Decision (EPA Region 4): City Industries, Winter Park, FL. (First Remedial Action), March 1990.
PB91-921530/REB 91-04 PC **A05/MF A01**

PB91-921531/REB
Superfund Record of Decision (EPA Region 4): Bypass 601 Groundwater Contamination Site (Martin Scrap Recycling Facility), Concord, NC. (First Remedial Action), August 1990.
PB91-921531/REB 91-04 PC **A04/MF A01**

PB91-921532/REB
Superfund Record of Decision (EPA Region 7): Wheeling Disposal Service Company Landfill, Amazonia, MO. (First Remedial Action), September 1990.
PB91-921532/REB 91-04 PC **A05/MF A01**

PB91-921533/REB
Superfund Record of Decision (EPA Region 2): Mattiace Petrochemical Company, Broome County, Glen Cove, NY. (First Remedial Action), September 1990.
PB91-921533/REB 91-04 PC **A03/MF A01**

PB91-921534/REB
Superfund Record of Decision (EPA Region 9): Intel Santa Clara III Superfund Site, Santa Clara, CA. (First Remedial Action), September 1990.
PB91-921534/REB 91-04 PC **A06/MF A02**

PB91-921535/REB
Superfund Record of Decision (EPA Region 9): Intersil/Siemens Superfund Site, Cupertino, CA. (First Remedial Action), September 1990.
PB91-921535/REB 91-04 PC **A06/MF A02**

PB91-921539/REB
Superfund Record of Decision (EPA Region 4): Howe Valley Landfill, Howe Valley, KY. (First Remedial Action), September 1990.
PB91-921539/REB 91-04 PC **A11/MF A03**

PB91-921540/REB
Superfund Record of Decision (EPA Region 8): Portland Cement Co. (Kiln Dust No. 2 and No. 3) Operable Unit 1, Salt Lake City, UT. (First Remedial Action), September 1990.
PB91-921540/REB 91-04 PC **A07/MF A02**

PB91-921541/REB
Superfund Record of Decision (EPA Region 7): Shenandoah Stables, Lincoln County, MO. (Second Remedial Action), September 1990.
PB91-921541/REB 91-04 PC **A03/MF A01**

PB91-921542/REB
Superfund Record of Decision (EPA Region 10): Fort Lewis Logistics Center, Pierce County, Fort Lewis, WA. (First Remedial Action), September 1990.
PB91-921542/REB 91-04 PC **A04/MF A01**

PB91-921543/REB
Superfund Record of Decision (EPA Region 6): Cimarron Mining Corporation Site, Operable Unit 1, Lincoln County, Carrizozo, NM. (First Remedial Action), September 1990.
PB91-921543/REB 91-04 PC **A05/MF A01**

PB91-921544/REB
Superfund Record of Decision (EPA Region 9): Solvent Service Superfund Site, San Jose, CA. (First Remedial Action), September 1990.
PB91-921544/REB 91-04 PC **A07/MF A02**

PB91-921545/REB
Superfund Record of Decision (EPA Region 5): Hagen Farm Site, Source Control Operable Unit, Dane County, WI. (First Remedial Action), September 1990.
PB91-921545/REB 91-04 PC **A03/MF A01**

PB91-921546/REB
Superfund Record of Decision (EPA Region 4): Yellow Water Road Site, Duval County, Baldwin, FL. (First Remedial Action), September 1990.
PB91-921546/REB 91-04 PC **A06/MF A02**

PB91-921547/REB
Superfund Record of Decision (EPA Region 5): Kummer Sanitary Landfill, Northern Township, Beltrami County, MN. (Third Remedial Action), September 1990.
PB91-921547/REB 91-04 PC **A05/MF A01**

PB91-921548/REB
Superfund Record of Decision (EPA Region 2): Cinnaminson Groundwater Contamination Site, Burlington County, NJ. (First Remedial Action), September 1990.
PB91-921548/REB 91-04 PC **A06/MF A02**

PB91-921549/REB
Superfund Record of Decision (EPA Region 2): Syosset Landfill, Nassau County, Syosset, NY. (First Remedial Action), September 1990.
PB91-921549/REB 91-04 PC **A06/MF A02**

PB91-921550/REB
Superfund Record of Decision (EPA Region 3): Coker's Sanitation Service Landfills, Kent County, DE. (First Remedial Action), September 1990.
PB91-921550/REB 91-04 PC **A05/MF A01**

PB91-921551/REB
Superfund Record of Decision: (EPA Region 2): Kentucky Avenue Wellfield Site, Town of Horseheads, Chemung County, New York (Second Remedial Action), September 28, 1990.
PB91-921551/REB 91-04 PC **A15**

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Superfund Record of Decision (EPA Region 5): Wayne Reclamation and Recycling, Columbia City, Indiana (First Remedial Action), Final Report, March 30, 1990.
PB91-921552/REB 91-04 PC **A05/MF A02**

PB91-921553/REB
Superfund Record of Decision (EPA Region 5): Spiegelberg Site, Green Oak Township, Livingston County, Michigan (First Remedial Action), Final Report, June 29, 1990.
PB91-921553/REB 91-04 PC **A04/MF A01**

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Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 22), Colorado (Sixth Remedial Action), Final Report, May 3, 1990.
PB91-921554/REB 91-04 PC **A05/MF A01**

PB91-921555/REB
Superfund Record of Decision (EPA Region 8): Rocky Mountain Arsenal (Operable Unit 23), Adams County, Colorado (Seventh Remedial Action), Final Draft, March 1990.
PB91-921555/REB 91-04 PC **A05/MF A01**

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Superfund Record of Decision (EPA Region 2): American Thermostat Site, South Cairo, Green County, New York (Second Remedial Action), Final Report, June 29, 1990.
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PB91-921557/REB 91-04 PC **A12/MF A03**

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Superfund Record of Decision (EPA Region 2): Sayreville Landfill Site, Borough of Sayreville, Middlesex County, New Jersey (First Remedial Action), September 28, 1990.
PB91-921558/REB 91-04 PC **A13/MF A03**

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Superfund Record of Decision (EPA Region 3): U.S. Titanium Superfund Site, Nelson County, Virginia (First Remedial Action), Final Report, November 29, 1990.
PB91-921559/REB 91-04 PC **A07/MF A02**

PB91-921560/REB
Superfund Record of Decision (EPA Region 4): Coleman Evans Wood Preserving Site, Duval County, Jacksonville, Florida (First Remedial Action (Amendment)), Final Report, September 9, 1990.
PB91-921560/REB 91-04 PC **A07/MF A02**

PB91-921561/REB
Superfund Record of Decision (EPA Region 4): Lewisburg Dump Site, Lewisburg, Marshall County, Tennessee (First Remedial Action), Final Report, September 19, 1990.
PB91-921561/REB 91-04 PC **A11/MF A03**

PB91-921562/REB
Superfund Record of Decision (EPA Region 5): Anderson Development Company Site, Adrian, Michigan (First Remedial Action), Final Report, September 28, 1990.
PB91-921562/REB 91-04 PC **A05/MF A01**

PB91-921563/REB
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PB91-921563/REB 91-04 PC **A08/MF A02**

PB91-921564/REB
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