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EPA Publications Bibliography

Quarterly Abstract Bulletin

PB93-904201
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QUARTERLY ABSTRACT BULLETIN

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SAMPLE ENTRY

NTIS Order Number/Media Code Price Codes	**PB90-120072/HSU PC A09/MF A01**
Report Title	Sensitivity of Ecological Landscapes and Regions to Global Climatic Change
Corporate Author	Oregon State Univ., Corvallis
Personal Authors	F. P. Neilson, G. A. King, R. L. DeVelice, J. Lenihan, and D. Marks.
Date	Sep 89
Pages	193p
Report Number	EPA/600/3-89/073
Contract Number	EPA-68-C8-0006 Prepared in cooperation with NSI Technology Services Corp., Corvallis, OR. Sponsored by Corvallis Environmental Research Lab., OR.
Abstract	Increasing awareness of the potential impacts from global climatic change has elicited a storm of research planning among all the major federal agencies. One of the primary difficulties confronted in the planning effort is the need to objectively define clear priorities for research dollars. The report is an attempt to contribute to the process of defining those priorities by scientifically defining specific regions, ecological systems and attributes of those systems that might be particularly sensitive to climatic change. Two approaches to addressing sensitivity have been defined, intrinsic sensitivity and sensitivity relative to a particular stressor. Intrinsic sensitivity is gauged by past variations in different ecosystems. Extrinsic or stressor relative sensitivity addressed the same question, but from the perspective of a particular stress.
Keywords (Descriptors & Identifiers)	*Climatic changes, *Environmental Surveys, *Research projects, Hydrology, Forecasting, Weather, Biological Surveys, Precipitation (Meteorology), Runoff, Natural Resources, Seasonal variations, Biomass, vegetation, Forestry, *Regional Analysis, * Ecosystems, *Global aspects, Federal agencies, Comprehensive planning.

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Quarterly Abstract Bulletin

PB92-228527/REB PC **A08**/MF **A02**
Environmental Protection Agency, Washington, DC.
Amoco-U.S. EPA Pollution Prevention Project, Yorktown, Virginia. Project Summary. Final rept. Nov 89-Jan 92.
Amoco Corp., Chicago, IL.
H. Klee, and M. Podar. Jun 92, 171p
Sponsored by Environmental Protection Agency, Washington, DC.

The volume summarizes data obtained and analyses conducted during a 2-year pollution prevention study of Amoco Oil Company's Yorktown, Virginia Refinery. The study was jointly sponsored as a cooperative effort of Amoco Corporation and the United States Environmental Protection Agency. A multi-media sampling program was used to identify potential pollution sources within the Refinery. Specific engineering projects were proposed to deal with major sources, and the simulated results of implementation were assessed in terms of environmental impact, cost, risk reduction for people living near the facility, and liability.

Keywords: *Pollution abatement, *Environmental protection, *Petroleum refineries, *Environmental impact assessments, Risk assessment, Pollution sources, US EPA, Environmental surveys, Sampling, Financial incentives, Liabilities, Legal incentives, Ranking, Permits, *Yorktown(Virginia), *Amoco, Cooperative agreements.

PB92-963282/REB PC **A03**/MF **A01**
ARARs Fact Sheet: Compliance with the Clean Air Act and Associated Air Quality Requirements. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Sep 92, 30p OSWER-9234.2-22FS
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 fact sheet provides updated guidance on compliance with the Clean Air Act, as amended November 1990 (42 USC 7401 et. seq.) and related air quality rules under other environmental statutes. It also addresses developing applicable or relevant and appropriate requirements (ARARs) policies and identifying and complying with ARARs at specific sites.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Air pollution abatement, Guidelines, Clean Air Act, Pollution regulations, State programs, Remedial action, Air quality, Requirements, Compliance, *Office of Solid Waste and Emergency Response, Applicable or Relevant and Appropriate Requirements.

PB92-963283/REB PC **A01**/MF **A01**
Superfund: Qualified Disadvantaged Business Utilization in State Response. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Apr 92, 5p OSWER-9375.5-13FS
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 fact sheet concentrates on Disadvantaged Business Enterprise utilization in cases where States are managing the cleanup of National Priority List sites. It introduces the Superfund process, focuses on disadvantaged business enterprise participation and involvement in state Superfund programs, provides a regulatory context for contracting practices, and offers additional information sources.

Keywords: *Superfund, *Waste management, *Hazardous materials, State programs, Remedial action, Contracts, Information transfer, Businesses, *Office of Solid Waste and Emergency Response, Disadvantaged Business Enterprises, Cleanup operations, National Priorities List.

PB92-963288/REB PC **A06**/MF **A02**
Superfund: Report of the EPA Superfund Revitalization Public Meeting Held on June 24, 1992. Volumes 1 and 2.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Sep 92, 102p OSWER-9202.1-07
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.

On June 24, 1992, the U.S. Environmental Protection Agency and its Superfund Revitalization Office helda meeting to encourage public participation in identifying innovative, non-traditional approaches to expedite the Superfund cleanup process. The agenda was structured to focus on four particular topic areas: ways to speed up the Superfund cleanup program; ways to encourage and manage voluntary cleanups by potentially responsible parties; effective ways to involve the state, the community, and other interested parties in the entire Superfund cleanup process; and ways to realistically describe the expectations of the Superfund program, measure its success in achieving the program's goals, and communicate these goals and successes to interested parties. The report, organized along the lines of the topics outlined above, documents suggestions that were made by attendees at the meeting, as well as written comments that were prepared specifically to address the issues discussed at the meeting. The report also provides a summary of EPA follow-up actions currently under consideration.

Keywords: *Superfund, *Meetings, *Citizen participation, *Remedial action, *Waste management, US EPA, Voluntary organizations, State government, Local government, Hazardous materials, Technical assistance, Public information, Information transfer, Cooperative programs, *Cleanup operations, Potentially responsible parties.

PB92-963375/REB PC **A11**/MF **A03**
Guidance for Performing Site Inspections under CERCLA. Interim rept. (Final).
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Sep 92, 244p EPA/540/R-92/021, OSWER-9345.1-05
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.

The guidance presents EPA's site inspection strategy. The strategy discusses procedural guidelines to investigate potential Superfund (CERCLA) sites for evaluation pursuant to the Hazard Ranking System (HRS), revised in accordance with the Superfund Amendments and Reauthorization Act of 1986. The HRS is the primary means by which EPA evaluates sites for Superfund's National Priorities List (NPL).

Keywords: *Superfund, *Inspection, *Site surveys, *Waste management, *Hazardous materials, US EPA, Ranking, Guidelines, Pollution regulations, Sampling, Environmental surveys, Public health, Comprehensive Environmental Response Compensation and Liability Act, National Priorities List.

PB92-963410/REB PC **A02**/MF **A01**
Consideration of ARARs during Removal Actions. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 92, 6p OSWER-9360.3-02FS
See also PB92-963401.
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 fact sheet summarizes a Superfund Removal Procedures (SRP) volume entitled 'Guidance on the Consideration of ARARs During Removal Actions' which describes the essential components of applicable or relevant and appropriate requirements (ARARs) for on-site removal actions, including identification of potential Federal and State ARARs, determination of when compliance with ARARs is not required, and documentation of ARARs evaluations.

Keywords: *Hazardous materials, *Removal, Requirements, Sites, Identifying, National government, State government, Compliance, Evaluation, Protection, Public health, Applicable Relevant Appropriate Requirements(ARARs), *Superfund.

PB92-963421/REB PC **A09**/MF **A02**
Superfund Emergency Response Actions: A Summary of Federally-Funded Removals. Sixth Annual Report, Fiscal Year 1991.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 92, 192p EPA/540/R-92/020, OSWER-9360.6-09
See also PB92-963403.
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 Superfund removal program has achieved significant accomplishments in responding to environmental emergencies, cleaning up hazardous waste sites, and making sites safe. For this reason, EPA publishes the Superfund Emergency Response Actions summary, which provides the public with valuable information about Superfund removal actions undertaken by EPA. This document is updated annually. The Sixth Annual Report, which is the fifth update to the initial document, summarizes the Superfund removal actions completed by EPA between October 1990 and September 1991.

Keywords: *Superfund, *Emergency planning, *Public information, *Hazardous materials, *Waste management, *Remedial action, US EPA, Federal aid, Funds, State government, Regional analysis, National government, Office of Solid Waste and Emergency Response, Cleanup operations, Comprehensive Environmental Response Compensation and Liability Act, Emergency Planning and Community Right-to-Know Act.

PB93-100113/REB PC **A10**/MF **A03**
AutoMOUSE: An Improvement to the MOUSE Computerized Uncertainty Analysis System Operational Manual.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
A. J. Klee. Aug 92, 210p EPA/600/R-92/145, EPA/SW/DK-92/053A
For system on diskette, see PB93-500007.

Under a mandate of national environmental laws, the agency strives to formulate and implement actions leading to a compatible balance between human activities and the ability of natural systems to support and nurture life. The Risk Reduction Engineering Laborato-

ry is responsible for planning, implementing, and managing research development, and demonstration programs to provide an authoritative, defensible engineering basis in support of the policies, programs, and regulations of the EPA with respect to drinking water, wastewater, pesticides, toxic substances, solid and hazardous wastes, and Superfund-related activities. The publication is one of the products of that research and provides a vital communication link between the researcher and the user community. The manual describes a system, called MOUSE (for Modular Oriented Uncertainty SystEm), for dealing with the computational problems of uncertainty, specifically in models that consist of a set of one or more equations. Since such models are frequently encountered in the fields of environmental science, risk analysis, economics, and engineering, the system has broad application throughout these fields. An important part of the MOUSE system is AutoMOUSE which actually writes the computer programs required for the uncertainty analysis computations. Thus, no prior programming knowledge is needed to learn or use MOUSE and, because of its transportability and compactness, the system can be run on a wide variety of personal computers available to the U.S. Environmental Protection Agency and/or its contractors and grantees.

Keywords: *Environmental impact assessments, *Environmental engineering, *Risk assessment, *User manuals(Computer programs), Documentation, Environmental health, Computerized simulation, Monte Carlo method, Stochastic processes, Revisions, Performance evaluation, Air pollution, Water pollution, Waste management, Public health, System analysis, *AutoMOUSE system, *Modular Oriented Uncertainty System.

PB93-100121/REB PC **A04**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Demonstration of a Trial Excavation at the McColl Superfund Site. Application analysis rept. (Final).
IT Corp., Cincinnati, OH.
Oct 92, 61p EPA/540/AR-92/015
Contract EPA-68-02-4284
See also PB92-226448. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The project describes the trial excavation performed at the McColl Hazardous Waste Site. Excavation at this site presents unique problems due to the high potential for release of sulfur dioxide and volatile odorous compounds contained in the waste. The excavation demonstration was used to obtain information on the utilization of an enclosure and associated air treatment systems around the excavation to minimize air emissions and the use of foam vapor suppressants to reduce emissions from the waste during excavation. In addition, information was obtained on processing the tar fraction of this waste by mixing it with cement and fly ash. The demonstration is documented in two reports: (1) a Technology Evaluation Report describing the field activities and laboratory results; and (2) this Applications Analysis Report, which interprets the data and discusses the potential applicability of the technology.

Keywords: *Superfund, *Hazardous materials, *Air pollution control, *Remedial action, *Waste treatment, Excavation, Design criteria, Performance evaluation, Economic analysis, Technology utilization, Volatile organic compounds, Sulfur dioxide, Materials handling, Incineration, *Fullerton(California).

PB93-100139/REB PC **A13**/MF **A03**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Arid Ecosystems Strategic Monitoring Plan, 1991. Environmental Monitoring and Assessment Program.
Lockheed Engineering and Sciences Co., Inc., Las Vegas, NV. Environmental Programs Office.
W. G. Kepner, C. A. Fox, J. Baker, B. Breckenridge, and C. Elvidge. Jun 91, 300p EPA/600/4-91/018
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In response to the growing concerns regarding the condition of the nation's ecological resources, the U.S. EPA has initiated the development of a national interagency program to determine the status of, and to monitor the changes in, ecological systems. This program is called the Environmental Monitoring and Assessment Program (EMAP). The Arid Ecosystem portion of EMAP includes grasslands, shrublands, woodlands, riparian zones, tundra and deserts in the arid (dryer) regions, primarily the central and western U.S. This document outlines a strategy for the development and operation of the Arid Ecosystems portion of EMAP. Through workshops, with interagency cooperation and technical support from universities, indicators (measures of ecological parameters) will be evaluated, developed and tested in small scale pilot field studies, before being implemented at larger scales. Also discussed in the document are the sampling design; plans for the use of remote sensing and GIS; development of the information management system; a quality assurance program; means for implementation of a large scale field sampling operation; and the guidelines for statistics, assessment and reporting for the program.

Keywords: *Environmental monitoring, *Ecosystems, *Arid land, *Natural resources, *Environmental protection, Biological indicators, Remote sensing, Sampling, Information management, Quality assurance, Implementation, US EPA, Interagency cooperation, Field tests, Guidelines, Statistical analysis, Assessments, Geographic information systems, *Environmental Monitoring and Assessment Program, Central Region(United States), Western Region(United States).

PB93-100147/REB PC **A07**/MF **A02**
Synoptic Approach to Cumulative Impact Assessment. A Proposed Methodology.
Corvallis Environmental Research Lab., OR.
S. G. Leibowitz, B. Abbruzzese, P. R. Adamus, L. E. Hughes, and J. T. Irish. Oct 92, 138p EPA/600/R-92/167
Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR., and Word Design, Covallis, OR.

The report provides resource managers and technical staff with an approach for evaluating the cumulative environmental effects of individual human impacts on the environment, particularly with respect to wetlands. The document is intended to give the reader a general understanding of cumulative impacts and to describe how a synoptic assessment is produced. Although specifically designed for use in wetland permit evaluation under the Clean Water Act (CWA), the method can be applied to cumulative impact assessment in general. A second objective of the report is to encourage resource managers responsible for wetland protection to consider and view wetlands within a landscape context.

Keywords: *Environmental impact assessments, *Wetlands, *Water quality management, *Water pollution, Waste disposal, Environmental effects, Clean Water Act, Man environment interactions, Permits, Case studies, Pollution regulations, Ecosystems, Reviews, Landscaping, Comparisons, Remedial action, Hydrology.

PB93-100154/REB PC **A04**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Technology Assessment of Soil Vapor Extraction and Air Sparging.
Camp, Dresser and McKee, Inc., Cambridge, MA.
M. E. Loden. Sep 92, 75p EPA/600/R-92/173
Contract EPA-68-03-3409
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Air sparging, also called 'in situ air stripping' and 'in situ volatilization' injects air into the saturated zone to strip away volatile organic compounds (VOCs) dissolved in groundwater and adsorbed to soil. These volatile contaminants transfer in a vapor phase to the unsaturated zone where soil vapor extraction (SVE) can then capture and remove them. In addition to removing VOCs via mass transfer, the oxygen in the injected air enhances subsurface biodegradation of contaminants. Air sparging is a relatively new treatment technology. Research efforts have not yet fully elucidated the scientific basis (or limitations) of the system, nor completely defined the associated engineering aspects. However, a substantial body of available information describes the effectiveness and characteristics of air sparging systems. This document summarizes the available literature and addresses case studies of practical air sparging applications. It also identifies needs for further research.

Keywords: *Water pollution control, *Land pollution control, *Stripping, *Volatile organic compounds, In-situ processing, Mass transfer, Case studies, Injection, Biodeterioration, Performance evaluation, *Air sparging, *Soil vapor extraction, Innovative treatment technologies.

PB93-100261/REB PC **A03**/MF **A01**
Toxic Substances Control Act (TSCA) Chemical Substances Inventory: Revised Synonym and Preferred Name File, June 1992. Record and Data Element Description.
Environmental Protection Agency, Washington, DC.
30 Jun 92, 40p* EPA/DF/MT-93/001A
For system on magnetic tape, see PB93-500197.

The computer-readable TSCA Chemical Substance Inventory is issued periodically to provide chemical substance information for those substances on the non-confidential substance identity portion of the TSCA Master Inventory File. For a complete understanding of the data contained on these tapes, it is necessary to consult the introductory material of the printed 1985 Edition and the 1990 Supplement to 1985 Edition. These tapes contain no TSCA Confidential Business Information. They have been prepared by Chemical Abstracts Service, a Division of the American Chemical Society, under contract to the U.S. Environmental Protection Agency. There are two major differences between these tapes of Inventory chemical substance information and the printed editions of the Inventory: the tapes do not include the EPA Accession Numbers or generic names for confidential substance identities; and synonyms in the Synonym File are those names provided on Inventory reporting forms, however the printed Inventory editions contain additional synonyms from the Chemical Abstracts Service data base.

Keywords: *Environmental surveys, *Chemical compounds, *User manuals, Revisions, Polymers, Free radicals, Documentation, *Toxic Substances Control Act, *Chemical Substances Inventory, CAS Registry Number, Chemical nomenclature, National Technical Information Service.

PB93-100311/REB PC **A02**/MF **A01**
RED Facts: Capsaicin. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Jun 92, 6p EPA/540/FS-92/219
See also PB93-101434.

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet on Capsaicin summarizes EPA's conclusion, as set forth in the Reregistration Eligibility Document (or RED), that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, Chemical properties, Regulations, Toxicology, Ecology, Insect repellents, Protection, *Chemical information fact sheet, *Capsaicin, Animal repellents, Use patterns, Science findings, Capsicum frutescens.

PB93-100352/REB PC **A02**/MF **A01**
RED Facts: 'Nosema locustae'. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Sep 92, 6p EPA/540/FS-93/225, EPA/738/F-92/011

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreason-

able adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet on Nosema Locustae summarizes EPA's conclusion, as set forth in the Reregistration Eligibility Document (or RED), that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Toxic substances, *Pesticides, Regulations, Chemical properties, Toxicology, Ecology, Agricultural products, Microorganisms, *Chemical information fact sheet, *Nosema locustae, Use patterns, Science findings.

PB93-100360/REB PC **A07**/MF **A02**
Reregistration Eligibility Document (RED) 'Nosema locustae'. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Sep 92, 132p EPA/540/RS-93/226
See also PB93-100352.

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The Reregistration Eligibility Document (or RED) on nosema locustae discusses the scientific data and other information supporting EPA's regulatory conclusion that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, Guidelines, Standards, Regulations, Toxicology, Ecology, Path of pollutants, Environmental effects, Public health, Exposure, Agricultural products, Labels, Risk assessment, Insecticides, *Reregistration, *Nosema locustae, Federal Insecticide Fungicide and Rodenticide Act, CAS 117-00-1.

PB93-100378/REB PC **A02**/MF **A01**
RED Facts: Streptomycin and Streptomycin Sulfate. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Sep 92, 7p EPA/540/FS-93/227, EPA/738/F-92/009
See also PB89-129738.

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet on streptomycin and streptomycin sulfate summarizes EPA's conclusion, as set forth in the Reregistration Eligibility Document (or RED), that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, *Streptomycins, Algicides, Chemical properties, Path of pollutants, Regulations, Toxicology, Ecology, Nitrogen organic compounds, Agricultural products, Bactericides, Fungicides, *Chemical information fact sheet, *Streptomycin sulfate, Use patterns, Science findings, CAS 57-92-1, CAS 3810-74-0, Glycoside/amino.

PB93-100386/REB PC **A09**/MF **A02**
Reregistration Eligibility Document (RED): Streptomycin and Streptomycin Sulfate.
Environmental Protection Agency, Arlington, VA. Special Review and Reregistration Div.
30 Sep 92, 188p EPA/540/RS-93/228

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The Reregistration Eligibility Document (or RED) for streptomycin and streptomycin sulfate discusses the scientific data and other information supporting EPA's regulatory conclusion that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, *Streptomycins, Guidelines, Pollution standards, Path of pollutants, Regulations, Toxicology, Ecology, Algicides, Nitrogen organic compounds, Fungicides, Agricultural products, Labels, Risk assessment, Environmental impact assessments, Manufacturing, Bactericides, *Reregistration, *Streptomycin sulfate, Glycoside/amino, Federal Insecticide Fungicide and Rodenticide Act, CAS 57-92-1, CAS 3810-74-0.

PB93-100865/REB PC **A12**/MF **A03**
Corvallis Environmental Research Lab., OR.
Evaluation of Terrestrial Indicators for Use in Ecological Assessments at Hazardous Waste Sites.
ManTech Environmental Technology, Inc., Corvallis, OR.
G. Linder, E. Ingham, J. Brandt, and G. Henderson. 24 Sep 92, 255p
See also PB89-205967. Prepared in cooperation with Missouri Univ.-Columbia, and Battelle Pacific Northwest Labs., Richland, WA. Sponsored by Corvallis Environmental Research Lab., OR.

The target audience for the compendium includes regional project managers and biological technical assistance groups. The methods summarized are grouped according to their potential target or receptor classification; animal, plant, or microbial. Methods which assess soils directly are emphasized here but additional methods applicable to wetlands soils or sediments have also been included to complement those methods readily available for aquatic and sediment toxicity assessment. Some of the methods summarized represent consensus standards that have previously been identified as methods applicable to soil testing, while others are less well characterized but remain potential candidate methods for biological evaluation of soil contamination. Tabular guides to the selection of tests methods applicable to various habitats and toxicity endpoints are summarized to help potential users select the most appropriate biological assessment tool for the site under consideration.

Keywords: *Terrestrial ecosystems, *Hazardous materials, *Waste disposal, *Superfund, *Biological effects, Bioassay, Biological indicators, Assessments, Toxicity, Soil contamination, Land pollution, Soil surveys, Standards, Regional project managers.

PB93-100907/REB PC **A07**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Guidance for Research House Studies of the Florida Radon Research Program. Volume 1. Research Plan. Final rept. Nov 89-Apr 91.
Princeton Univ., NJ. Center for Energy and Environmental Studies.
K. J. Gadsby, and T. A. Reddy. Sep 92, 126p EPA/600/R-92/191A
Grant EPA-R-817013
See also DE89016676, PB91-234468 and PB92-115294. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report provides guidance and a readily available reference to groups involved with the Florida Radon Research Program's (FRRP's) research house studies. It includes: (1) Lists of parameters for continuous and periodic high and low resolution measurements; (2) Protocols for characterization and specialty measurements; (3) Data storage variable assignments so that researchers can have access to a standardized data set; and (4) An example of an approved Quality Assurance Project Plan. Although various types of radon research have been conducted in houses in many areas of the country, there had not been a coordinated approach to studying these houses with the objective of developing construction codes and standards. Soils, construction styles, and techniques in Florida are somewhat different from those in the areas where most of the research data originated. The FRRP put in place a research strategy where most of the factors that influence the transport and entry of radon into these houses would be studied. The research house component of the program would utilize four to six unoccupied houses in three locales to study the radon entry effects in different types of construction, soil conditions, and climate of Florida.

Keywords: *Radon, *Houses, *Indoor air pollution, *Radiation monitoring, *Research, Emission factors, Construction, Soil surveys, Climate, Florida, Continuous sampling, Building codes, Residential buildings, Quality assurance, Standards, *Florida Radon Research Program, Protocols.

PB93-100915/REB PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Guidance for Research House Studies of the Florida Radon Research Program. Volume 2. Model-Backed Experimental Protocol for Determining Radon Resistance of Buildings. Final rept. Nov 89-Apr 91.
Princeton Univ., NJ. Center for Energy and Environmental Studies.
T. A. Reddy, K. J. Gadsby, and A. Cavallo. Sep 92, 59p EPA/600/R-92/191B
Grant EPA-R-817013
See also PB93-100907. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

One of the main objectives guiding future research in the framework of the Florida Radon Research Program (FRRP) and of the Radon Mitigation Branch of U.S. EPA, is the need toensure the availability of technically defensible and cost effective building standards for radon protection. The document describes the preliminary methodology of a study initiated in order to develop a model-backed experimental protocol capable of: (1) identifying and then quantifying the relative importance of different radon entry pathways into a house and of the movement of radon inside the house, and (2) evaluating the effectiveness of certain radon resistant measures which may include changes in house construction as well as the manner in which certain equipment is operated. The rationale of the particular approach as opposed to using mathematical computer codes is also discussed. The macroscopic model is described at length, while the development of the corresponding experimental protocol will be a future research project. The validity of the approach will be evaluated shortly with respect to data from a research house in the Princeton, New Jersey area.

Keywords: *Radon, *Houses, *Indoor air pollution, *Mathematical models, *Radiation monitoring, Guidelines, Path of pollutants, Experimental design, Environmental transport, Construction, Computerized simulation, Construction, Air flow, Building codes, Ventilation, Air pollution control, Case studies, *Florida Radon Research Program, *Protocols, Princeton(New Jersey).

PB93-100980/REB PC **A18**/MF **A04**
Environmental Protection Agency, Washington, DC.
Biologic Markers in Reproductive Toxicology. Final rept.
National Research Council, Washington, DC. Commission on Life Sciences.
c1989, 401p ISBN-0-309-03937-7
Grant EPA-R-812547
Library of Congress catalog card no. 89-3071. Sponsored by Environmental Protection Agency, Washington, DC.

Experts are increasingly concerned that exposure to toxic substances in our environment is impairing our reproductive and developmental processes. Biologic markers have emerged as a promising tool for understanding the environmental effects of toxic substances. This report clarifies the underlying concepts of the use of biologic markers in general and explores how a broad range of biologic markers may be the key to our understanding of environmental health effects, particularly in the reproductive field, early enough to make a difference in people's lives. The four major text sections in this book are male reproduction, female reproduction, biologic markers of pregnancy, and biologic markers of neurodevelopment. Each section presents a detailed view of what is understood about human systems--including the most recent research results--and how biologic markers may specifically be applied.

Keywords: *Toxicology, *Reproduction(Biology), *Biological markers, Males, Females, Male infertility, Muta-

tions, Testis, Ovary, Menstruation, Epididymis, Pregnancy, Animals, Humans, Immunology, Pharmacokinetics, Aging(Biology).

PB93-101079/REB PC A04/MF A01
Lead in Drinking Water Regulation: Public Education Guidance (Guidance for Conducting a Community-Based Public Education Program on Lead in Drinking Water).
Environmental Protection Agency, Washington, DC. Office of Drinking Water.
Jul 92, 54p EPA/812/B-92/002

The document provides information to water suppliers on how to conduct a community-based public education program on lead in drinking water to ensure compliance with EPA's final Lead and Copper Rule. Information includes the following: organizing a community task force, developing an action plan, preparing public education materials, developing a water-testing program, and implementing the program. Sample public education materials are included as exhibits.

Keywords: *Regulations, *Lead(Metal), *Potable water, Water supply, Communities, Education, Tests, Training aids.

PB93-101111/REB PC A04/MF A01
Wellhead Protection Programs: Tools for Local Governments.
Environmental Protection Agency, Washington, DC. Office of Ground-Water Protection.
R. Harvey, and P. Linquiti. Apr 89, 58p EPA/440/6-89/002
See also PB88-111893.

The Technical Assistance Document (TAD) describes how localities can, as a part of a State Wellhead Protection Program, develop and implement effective techniques for the protection of ground water. The document emphasizes innovative wellhead protection methods that have been used by local communities, discusses combinations of programs that have worked well, and presents several factors that affect the success of local wellhead protection programs, such as budgetary constraints and legal issues.

Keywords: *Water quality management, *Water pollution abatement, *Ground water, *Water wells, Local government, Environmental protection, Pollution sources, Technology innovation, Implementation, Aquifers, Legal aspects, Legislation, Pollution laws, *Wellhead Protection Program.

PB93-101152/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Carver-Greenfield Process (Trade Name) Dehydro-Tech Corporation. Applications Analysis Report. Final rept.
PRC Environmental Management, Inc., Cincinnati, OH.
Sep 92, 49p EPA/540/AR-92/002
Contract EPA-68-C0-0047
See also PB92-217462. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The report evaluates the Dehydro-Tech Corporation's Carver-Greenfield (C-G) Process and focuses on the technology's ability to separate waste mixtures into their constituent solid, organic and water fractions while producing a solid residual that meets applicable disposal requirements. The report presents performance and economic data from the U.S. Environmental Protection Agency Superfund Innovative Technology Evaluation (SITE) demonstration and three case studies. The C-G Process demonstration was conducted as a part of the SITE Program at the Risk Reduction Engineering Laboratory's Releases Control Branch facility in Edison, New Jersey, using drilling mud waste from the PAB Oil Superfund site in Abbeville, Louisiana. The system generated a treated solids product that passed Toxicity Characteristic Leaching Procedure (TCLP) criteria for volatiles, semivolatiles and metals. Potential wastes that might be treated by the technology include industrial residues, Resource Conservation and Recovery Act wastes, Superfund wastes and other wastes contaminated with organic compounds. Economic analyses indicate that the cost of using the C-G process is about $523/ton of which $302 is for site-specific expenses.

Keywords: *Waste treatment, *Separation processes, *Solvent extraction, *Hazardous materials, Waste disposal, Requirements, Technology innovation, Performance evaluation, Case studies, Superfund, Distillation, Oils, Process charting, Organic compounds, Industrial wastes, Solid wastes, Water, Economic analysis, Pollution regulations, *Innovative treatment technologies, *Carver-Greenfield process, Superfund Innovative Technology Evaluation, Abbeville(Louisiana).

PB93-101160/REB PC A06/MF A02
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Surface-Coating-Free Materials Workshop Summary Report. Held in San Diego, CA. on July 17-19, 1991. Rept. for Dec 90-Jul 91.
Research Triangle Inst., Research Triangle Park, NC.
C. M. Northeim, M. W. Moore, and J. L. Warren. Aug 92, 111p EPA/600/R-92/159
Grant EPA-R-815169
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report documents a pollution prevention workshop that explored the concept of surface-coating-free materials (SCFMs) and the potential impact of the type of material on volatile organic compound (VOC) and air toxic emissions from surface coating operations. The report summarizes the background and methodology used in planning the workshop, discussions that took place in the brainstorming sessions, and recommendations from the workshop. Included with the report are the technical papers presented as part of the workshop. The workshop consisted of two parts: technical paper presentations and brainstorming sessions. Technical papers were presented by representatives of varied industries that currently use or are developing SCFMs. The aim of the small group brainstorming sessions was to discuss topics related to the use of SCFMs. A major objective of these sessions was to identify and develop prevention research concepts and recommendations for consideration by EPA that could expand the use of SCFMs.

Keywords: *Meetings, *Air pollution abatement, *Volatile organic compounds, *Coating processes, Environmental chemical substitutes, Substitutes, Air quality, Stationary sources, Metals, Plastics, Research and development, Regulations, Technology innovation, Materials tests, Aging tests(Materials), *Surface coating free materials.

PB93-101434/REB PC A08/MF A02
Reregistration Eligibility Document (RED): Capsaicin. (List D, Case 4018).
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Jun 92, 156p EPA/540/RS-92/222

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The Reregistration Eligibility Document (or RED) for Capsaicin discusses the scientific data and other information supporting EPA's regulatory conclusion that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, Guidelines, Insect repellents, Toxicology, Ecology, Path of pollutants, Standards, Nitrogen organic compounds, Regulations, Risk assessment, Agricultural products, Labels, Public health, Environmental impact assessments, *Reregistration, *Capsaicin, Federal Insecticide Fungicide and Rodenticide Act, CAS 404-86-4.

PB93-101533/REB PC A10/MF A03
Environmental Protection Agency, Washington, DC. Drinking Water Standards Div.
Lead and Copper Rule Guidance Manual. Volume 2. Corrosion Control Treatment.
Black and Veatch, Kansas City, MO.
Sep 92, 209p EPA/811/B-92/002
Contract EPA-68-CO-0062
See also PB92-112101. Prepared in cooperation with Pirnie (Malcolm), Inc., Mahwah, NJ. Sponsored by Environmental Protection Agency, Washington, DC. Drinking Water Standards Div.

The volume focuses on the evaluation of corrosion control treatment options and optimization of the full-scale treatment. The manual discusses the procedures that can be used by water systems to determine the appropriate corrosion control treatment. It also discusses the available testing protocols for conducting the demonstration studies that many large systems will be required to perform prior to making their treatment recommendation to the State. For smaller systems, the manual contains a summary of case studies separated by the raw water quality to assist these systems in making their treatment recommendation to the State. The manual also provides guidance to assist State regulatory agencies in reviewing data from corrosion control studies and in specifying optimal water quality parameters. An additional chapter provides guidance on the lead service line replacement requirements.

Keywords: *Corrosion control, *Water treatment, *Potable water, *Lead(Metal), *Water pollution sampling, *Copper, Water distribution(Applied), Guidelines, Manuals, Regulations, Requirements, Distribution systems, Corrosion prevention, Substitutes, Water quality, Operations, Implementation, Performance standards, *Lead and Copper Rule.

PB93-101640/REB PC A02/MF A01
RED Facts: Zinc Salts. Fact sheet.
Environmental Protection Agency, Arlington, VA. Special Review and Reregistration Div.
Aug 92, 6p EPA/540/FS-93/230, EPA/738/F-92/007

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet on zinc salts summarizes EPA's conclusion, as set forth in the Reregistration Eligibility Document (or RED), that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Zinc compounds, *Inorganic salts, *Pesticides, *Toxic substances, Herbicides, Wood preservatives, Fungicides, Zinc chlorides, Zinc oxides, Growth regulators, Risk assessment, Regulations, Labels, Zinc sulfates, Toxicology, Path of pollutants, Ecology, Environmental impact assessments, *Reregistration, *Chemical Information Fact Sheet, Use patterns, Science findings.

PB93-101657/REB PC A11/MF A03
Reregistration Eligibility Document (RED) Zinc Salts.
Environmental Protection Agency, Arlington, VA. Special Review and Reregistration Div.
Sep 92, 226p EPA/540/RS-93/229

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The Reregistration Eligibility Document (or RED) on zinc salts discusses the scientific data and other information supporting EPA's regulatory conclusion that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, *Zinc compounds, *Inorganic salts, Guidelines, Standards, Herbicides, Wood preservatives, Fungicides, Zinc chlorides, Zinc oxides, Requirements, Environmental impact assessments, Ecology, Path of pollutants, Toxicology, Growth regulators, Risk assessment, Regulations, Labels, Zinc sulfates, *Reregistration, Federal Insecticides Fungicide and Rodenticide Act.

PB93-101665/REB PC **A02**/MF **A01**
RED Facts: Soap Salts. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Sep 92, 7p EPA/540/FS-93/232, EPA/738/F-92/013
See also PB93-101673.

All pesticides sold or used in the United States must be registered by EPA, based on scientific studies showing that they can be used without posing unreasonable risks to people or the environment. Because of advances in scientific knowledge, the law requires that pesticides which were first registered years ago be reregistered to ensure that they meet today's more stringent standards. In evaluating pesticides for reregistration, EPA obtains and reviews a complete set of studies from pesticide producers, describing the human health and environmental effects of each pesticide. The Agency imposes any regulatory controls that are needed to effectively manage each pesticide's risks. EPA then reregisters pesticides that can be used without posting undue hazards to human health or the environment. When a pesticide is eligible for reregistration, EPA announces this and explains why in a Reregistration Eligibility Document, or RED. This fact sheet summarizes the information in the RED for soap salts.

Keywords: *Pesticides, *Toxic substances, *Aliphatic acid esters, *Potassium compounds, *Ammonium compounds, Standards, Regulations, Toxicology, Ecology, Path of pollutants, Public health, Labels, Agricultural products, Risk assessment, Fatty acids, Exposure, Environmental effects, *Reregistration, *Chemical Information Fact Sheet, *Soap salts, Use patterns, Science findings.

PB93-101673/REB PC **A13**/MF **A03**
Reregistration Eligibility Document (RED) Soap Salts.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Sep 92, 300p EPA/540/RS-93/231
See also PB93-101665.

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The Reregistration Eligibility Document (or RED) on soap salts discusses the scientific data and other information supporting EPA's regulatory conclusion that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, *Aliphatic acid esters, *Potassium compounds, *Ammonium compounds, Guidelines, Standards, Regulations, Toxicology, Ecology, Public health, Labels, Path of pollutants, Agricultural products, Fatty acids, Environmental effects, Exposure, *Reregistration, *Soap salts, Federal Insecticide Fungicide and Rodenticide Act.

PB93-102192/REB PC **A04**/MF **A01**
Framework for Ecological Risk Assessment.
Environmental Protection Agency, Washington, DC. Risk Assessment Forum.
D. Rodier, and S. Norton. Feb 92, 59p EPA/630/R-92/001
See also PB92-172122.

Increased interest in ecological issues such as global climate change, habitat loss, acid deposition, reduced biological diversity, and the ecological impacts of pesticides and toxic chemicals prompts this U.S. Environmental Protection Agency (EPA) report, A Framework for Ecological Risk Assessment ('Framework Report'). The report describes basic elements, or a framework, for evaluating scientific information on the adverse effects of physical and chemical stressors on the environment. The framework offers starting principles and a simple structure as guidance for current ecological risk assessments and as a foundation for future EPA proposals for risk assessment guidelines.

Keywords: *Risk assessment, *Ecology, *Environmental surveys, *Man environment interactions, *Chemical compounds, Exposure, Environmental effects, Management planning, US EPA, Dose-response relationships, Data processing, Guidelines, Forecasting, Biological effects, Technology utilization.

PB93-102200/REB PC **A05**/MF **A01**
Report on the Ecological Risk Assessment Guidelines Strategic Planning Workshop. Held in Miami, Florida on April 30-May 2, 1991.
Environmental Protection Agency, Washington, DC. Risk Assessment Forum.
Feb 92, 76p EPA/630/R-92/002

The U.S. Environmental Protection Agency (EPA) is presently developing guidelines for conducting ecological risk assessments. This task is particularly challenging because ecological risks result from exposure of populations, communities, and ecosystems to chemical and non-chemical stressors acting individually or in combination over diverse spatial scales that can include multiple ecosystems. In view of the complex nature of this subject and to provide a basis for planning ecological risk assessment guidelines, the EPA's Risk Assessment Forum convened a scientific workshop at the University of Miami's Rosenstiel School of Marine and Atmospheric Science. Scientists and experts in ecology and ecological risk assessment from EPA, academia, and other government agencies explored the technical basis for a strategic plan that could be used by the Agency for developing ecological risk assessment guidelines. Topics discussed included: (1) the best scientific approach to organizing ecological risk assessments; (2) the scientific feasibility of implementing ecological risk assessment guidelines for a wide range of stress categories and ecosystems; (3) the scientific issues relative to the risk assessment process; and (4) the subject matter and titles that will constitute the ecological risk assessment guidelines bookshelf.

Keywords: *Risk assessment, *Ecology, *Meetings, *Environmental surveys, *Man environment interactions, *Chemical compounds, US EPA, Guidelines, Exposure, Management planning, Implementation, Environmental effects, Forecasting, Feasibility studies, Ecosystems.

PB93-102234/REB PC **A04**/MF **A01**
Volunteer Lake Monitoring Program, 1991. Volume 5. East-Central Illinois Region. Annual rept.
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
A. J. Burns. Mar 92, 71p IEPA/WPC/92-110E
See also PB92-222512 and PB92-222876.

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 volunteer also records a series of field observations such as water color, suspended sediment and algae, aquatic weeds, and weather conditions. Recent lake management activities or other factors which could impact the lake also are documented.

Keywords: *Water quality data, *Lakes, *Illinois, *Water pollution, Measurement, Transparency, Color, Suspended sediments, Nitrogen, Volatile organic compounds, Weather, Sites, Monitoring, Maps, Volunteers.

PB93-105518/REB PC **A08**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Emission Test Report. OMSS Field Test on Carbon Injection for Mercury Control. Final rept. Mar 91-May 92.
Radian Corp., Research Triangle Park, NC.
K. L. Nebel, D. M. White, C. R. Parrish, T. G. Zirkie, and M. A. Palazzolo. Sep 92, 162p EPA/600/R-92/192
Contracts EPA-68-D1-0010/006, EPA-68-D9-0054/2-56
See also PB92-195940 and PB92-105542. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report discusses results of a parametric evaluation of powdered activated carbon for control of mercury (Hg) emission from a municipal waste combustor (MWC) equipped with a lime spray dryer absorber/fabric filter (SD/FF). The primary test objectives were to evaluate the effect of carbon type, feed rate, and feed location on Hg emissions and control efficiency. Secondary process parameters studied included the impact of ammonia injection for nitrogen oxides control, SD outlet temperature, and SD/FF acid gas control efficiency on Hg removal. The time stability of Hg collected with ash was also studied. Conducted at the Ogden Martin Systems of Stanislaus, Inc. MWC, near Modesto, CA, testing covered 16 system operating conditions, including normal unit operation (no carbon injection) and operation without ammonia injection. Test results showed that the two primary variables affecting both Hg emission and control efficiency were carbon feed rate and uncontrolled Hg levels.

Keywords: *Mercury(Metal), *Activated carbon treatment, *Pollution control, Municipalities, Spraying, Combustion, Injection, Ammonia, Operations, Test methods, Field tests, Powdered activated carbon.

PB93-105534/REB PC **A04**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Pollution, Prevention, and Toxics.
Laboratory Method to Determine the Retention of Liquids on the Surface of Hands. Final rept.
Versar, Inc., Springfield, VA.
C. Cinalli, C. Carter, A. Clark, and D. Dixon. Sep 92, 72p EPA/747/R-92/003
Contract EPA-68-02-4254
Sponsored by Environmental Protection Agency, Washington, DC. Office of Pollution, Prevention, and Toxics.

The purpose of the report is to present data collected in three laboratory trials designed to quantify the amount of liquid deposited onto the surface of hands. The information is needed to calculate dermal exposure using the film thickness model developed in Volume 7 of the Methods for Assessing Consumer Exposure to Chemical Substances series (EPA 560/5-85-007). The study focuses on retention on hands of three nonaqueous liquids, bath oil, cooking oil, and mineral oil. For each subject-liquid combination, three different methods of liquid application, or testing, were employed: initial wipe, secondary wipe, and immersion. The amount ofliquid retained on the hands of the four subjects was measured immediately after the application and also after subsequent partial and full removals by a dry cloth designed to remove liquid from the hands.

Keywords: *Exposure, *Dermal, *Surfaces, *Hands, Tests, Laboratories, Liquids, Oils, Vegetable oils, Volume, Assessments, Films, Thickness, Viscosity, Chemical substances.

PB93-105542/REB PC **A05**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Evaluation of Two Methods for the Measurement of Mercury Emissions in Exhaust Gases from a Municipal Waste Combustor.
Radian Corp., Morrisville, NC.
Mar 92, 88p DCN-92-239-026-12-07, EPA/450/4-92/013
Contract EPA-68-D10010, EPA-68-D90054
See also PB93-105518. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The report describes the results of a test program at a municipal waste combustor to assess the precision of EPA Method 101A for the measurement of mercury emission and the precision of the multiple metals method (also known as draft Method 29) for mercury, cadmium, and lead emissions. A secondary objective of the test program was to determine if the two methods provided statistically significant different mercury results. The test program was part of a larger study to assess the effect of activated carbon injection on mercury emissions at the facility.

Keywords: *Exhaust gases, *Mercury(Metal), *Air pollution, Concentration(Composition), Tests, Comparison, Combustors, Evaluation, Carbon, Injection.

PB93-105559/REB PC **A10**/MF **A03**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Evaluation of CO Intersection Modeling Techniques Using a New York City Database.
Sigma Research Corp., Concord, MA.
Aug 92, 213p EPA/454/R-92/004
Contract EPA-68D90067

Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The United States Environmental Protection Agency (EPA) is interested in updating the guidance for modeling carbon monoxide (CO) generated by mobile sources at intersections. This document describes the procedures followed and results obtained in evaluating the performance of eight modeling techniques in simulating concentrations of CO at the six intersections monitored as part of the Route 9A Reconstruction Project in New York City. The eight modeling techniques evaluated include: 1985 Highway Capacity Manual Modified CAL3Q Model; Federal Highway Administration (FHWA) Intersection Model; Georgia Intersection Model; EPA Intersection Model; California Line Source Model; MOBILE4 Modified Volume 9 Technique; Texas Intersection Model; and Intersection Midblock Model. The ultimate objective of this study is to determine which of the eight intersection modeling techniques most accurately simulates the highest measured CO concentrations and whether the performance of that technique is significantly different than the other modeling techniques.

Keywords: *Carbon monoxide, *Mathematical models, *Roads, *Mobile pollutant sources, *Air pollution monitoring, Intersections, Concentration(Composition), New York, Performance evaluation, Emission factors, Exhaust emissions, Computerized simulation, Traffic, Field tests, Comparison, Highways, New York City(New York).

PB93-105567/REB PC **A09**/MF **A03**
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Protecting Coastal and Wetlands Resources: A Guide for Local Governments.
Industrial Economics, Inc., Cambridge, MA.
Oct 92, 197p EPA/842/R-92/002
Contract EPA-68-C8-0034
See also PB84-156702. Sponsored by Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.

Contents: Introduction (What isGrowth Management); The Problem; The Need for Local Action; Formulating a Local Plan; The Use of Zoning and other Regulatory Measures to Protect Coastal and Wetlands Resources; The Acquisition of Wetlands and Coastal Areas; Using Taxes, Fees, and other Economic Tools to Finance and Encourage the Protection of Coastal and Wetlands Resources; and Selecting Appropriate Techniques to Protect Coastal and Wetlands Resources.

Keywords: *Protection, *Coasts, *Oceans, *Watersheds, Water resources, Project planning, Land use zoning, Regulations, Ordinances, Land acquisition, Taxes, Revenue, Credit, Management, Bibliographies, *Wetlands.

PB93-105575/REB PC **A02**/MF **A01**
Engineering Bulletin: Slurry Walls.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 92, 10p EPA/540/S-92/008

Slurry walls are used at Superfund sites to contain the waste or contamination and to reduce the potential of future migration of waste constituents. In many cases slurry walls are used in conjunction with other waste treatment technologies, such as covers and ground water pump-and-treat systems. This bulletin discusses various aspects of slurry walls including their applicability, limitations on their use, a description of the technology including innovative techniques, and materials of construction including new alternative barrier materials, site requirements, performance data, the status of these methods, and sources of further information.

Keywords: *Superfund, *Containment, *Waste treatment, *Hazardous materials, Waste management, Construction materials, Barriers, Performance evaluation, Substitutes, Technology utilization, Remedial action, Site surveys, *Slurry walls, Innovative treatment technologies.

PB93-105583/REB PC **A02**/MF **A01**
Engineering Bulletin: Pyrolysis Treatment.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 92, 8p EPA/540/S-92/010

The Engineering Bulletins are a series of documents that summarize the latest information available on selected treatment and site remediation technologies and related issues. Pyrolysis is formally defined as chemical decomposition induced in organic materials by heat in the absence of oxygen. Pyrolysis is a thermal process that transforms hazardous organic materials into gaseous components and a solid residue (coke) containing fixed carbon and ash. Upon cooling, the gaseous components condense, leaving an oil/tar residue. Pyrolysis is applicable to a wide range of organic wastes and is generally not used in treating wastes consisting primarily of inorganics and metals. 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: *Superfund, *Remedial action, *Waste treatment, *Pyrolysis, *Hazardous materials, *Soil treatment, Heat treatment, Residues, Organic compounds, Decomposition, Sludges, Performance evaluation, Information transfer, Cleanup operations.

PB93-105591/REB PC **A02**/MF **A01**
Engineering Bulletin: Technology Preselection Data Requirements.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 92, 9p EPA/540/S-92/009

The bulletin provides a listing of soil, water, and contaminant data elements needed to evaluate the potential applicability of technologies for treating contaminated soils and water. With this base set of data in hand, experts familiar with the applicability of treatment technologies can better focus the advice and assistance they give to those involved at Superfund sites. The data compiled should permit preselection of applicable treatment methods and the direct elimination of others. This bulletin emphasizes the site physical and chemical soil and water characteristics for which observations and measurements should be compiled. Gathering and analyzing the information called for in this bulletin prior to extensive field investigations will facilitate streamlining and targeting of the sampling and analytical objectives of the overall program.

Keywords: *Superfund, *Waste treatment, *Soil treatment, *Hazardous materials, *Water pollution, Guidelines, Listings, Soil contamination, Ground water, Technology utilization, Land pollution, Physical properties, Data processing, Remedial action, Chemical compounds, Site surveys, Soil chemistry, Water chemistry, *Data requirements, Cleanup operations.

PB93-105609/REB PC **A03**/MF **A01**
Protecting the Nation's Wetlands, Oceans, and Watersheds: An Overview of Programs and Activities.
Environmental Protection Agency, Washington, DC. Office of Wetlands, Oceans and Watersheds.
Jul 92, 24p EPA/840/S-92/001
Color illustrations reproduced in black and white.

Wetlands, oceans, and watersheds are vitally linked; their health depends on the water quality of the particular watersheds that feed them. Because of their interconnectedness, an integrated, cooperative approach engaging the various water programs within the U.S. Environmental Protection Agency (EPA) is the most effective way to manage and protect these irreplaceable resources. EPA's Office of Wetlands, Oceans and Watersheds (OWOW) was created in April 1991 to integrate the protection and management of our Nation's watersheds, coastal and marine waters, and wetlands. OWOW combines the Agency's responsibilities for abating nonpoint source pollution; restoring and protecting wetlands, lakes, rivers, coastal and marine environments; and providing leadership for surface water monitoring and water quality assessment activities. The booklet discusses these topics.

Keywords: *Water pollution abatement, *Wetlands, *Oceans, *Watersheds, *Water quality management, Environmental protection, Water flow, Environmental transport, Water pollution control, Waste disposal, Surface waters, Ecosystems, Public information, Regulations, Habitats, US EPA, Risk assessment, *Office of Wetlands Oceans and Watersheds.

PB93-105617/REB PC **A03**/MF **A01**
Literature Survey of Innovative Technologies for Hazardous Waste Site Remediation, 1987-1991.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Jul 92, 50p* EPA/542/B-92/004, ISBN-0-16-036253-9
Also available from Supt. of Docs.

EPA's Office of Solid Waste and Emergency Response is seeking to further the use of innovative hazardous waste treatment technologies in its programs. In order to achieve more permanent remedies, the Agency is encouraging the use of new or innovative technologies that are capable of treating contaminated soils/sludges and ground water more effectively, less expensively, and in a manner more acceptable to the public than existing conventional methods. The bibliography is intended to increase the efficiency of the technology evaluation process. The document is not meant to be comprehensive in scope nor is it meant to convey an endorsement of the citations. It is meant to provide a survey of publications which could be useful when innovative technologies are investigated. As a research aid, the bibliography can help provide insights into current developments and provide references which may serve as a basis for further investigations.

Keywords: *Hazardous materials, *Remedial action, *Waste treatment, *Soil treatment, *Bibliographies, Sludges, Water pollution control, Soil contamination, Reviews, Performance evaluation, Heat treatment, Dechlorination, Substitutes, Technology innovation, In-situ processing, Vitrification, Biological treatment, Ground water, *Innovative treatment technologies, Cleanup operations, Soil washing, Soil venting, Soil vapor extracting.

PB93-105625/REB PC **A05**/MF **A02**
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Technical Guidance Document: Construction Quality Management for Remedial Action and Remedial Design Waste Containment Systems.
Hazen and Sawyer, Raleigh, NC.
G. N. Richardson. Oct 92, 100p EPA/540/R-92/073
Contract EPA-68-C0-0068
See also PB88-113295. Sponsored by Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.

The Technical Guidance Document is intended to augment the numerous construction quality control and construction quality assurance (CQC and CQA) documents that are available for materials associated with waste containment systems developed for Superfund site remediation. In general, the manual is oriented to the remediation project manager (RPM) who must administer these projects. This document reviews the significant physical properties associated with the construction materials used in waste containment designs and reviews the sampling and acceptance strategies required for Construction Quality Management. The first chapter reviews the minimum Federal regulatory requirements for waste containment systems. Key elements of these systems are identified. The second chapter reviews the key physical properties and conformance tests required to verify these properties. The third chapter reviews sampling methods and acceptance criteria that are used to verify key physical properties during construction.

Keywords: *Remedial action, *Hazardous materials, *Superfund, *Waste management, *Containment, Coverings, Earth fills, Surface impoundments, Construction materials, Long term effects, Sampling, Performance evaluation, Linings, Barriers, Design criteria, Layers, Site surveys, Ground disposal, Quality control, Quality assurance, *Remedial designs, Geosynthetic materials, Remedial project managers.

PB93-106623/REB PC **A05**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Combustion Area Sources: Data Sources. Final rept. Oct 91-Jan 92.
Alliance Technologies Corp., Chapel Hill, NC.
D. Bowman, S. Lowe, J. Purple, R. Randolph, and D. Winkler. Oct 92, 91p CH-92-04, EPA/600/R-92/197
Contract EPA-68-D9-0173

Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report identifies, documents, and evaluates data sources for stationary area source emissions, including solid waste and agricultural burning. Area source emissions of particulate matter, sulfur dioxide, oxides of nitrogen, reactive volatile organic compounds, and carbon monoxide are estimated annually by the National Air Data Branch of EPA's Office of Air Quality Planning and Standards. Area sources include all mobile sources and any stationary sources that are too small, difficult, or numerous to be inventoried as point sources. The original National Emissions Data System (NEDS) area source methodology and algorithms were developed in 1973 and 1974, using 1960 census data. Current methods need to be updated or revised.

Keywords: *Combustion, *Agricultural wastes, *Pollution control, Air pollution, Solid waste disposal, Burning, Sulfur dioxide, Nitrogen oxides, Carbon monoxide, Sources, Mobility, Algorithms, Volatile organic compounds, Inventories.

PB93-106631/REB PC **A03**/MF **A01**
32P-Postlabeling in Studies of PAH Activation.
Health Effects Research Lab., Research Triangle Park, NC. Carcinogenesis and Metabolism Branch.
J. A. Ross, and S. Nesnow. 1992, 24p EPA/600/A-92/176
See also PB92-110485.

Polycyclic aromatic hydrocarbons (PAH) undergo metabolic activation reactions to form intermediates that react with DNA to form covalent adducts. PAH administration leads to the formation of various types of DNA adducts that may differ between species, strains, and tissues due to differences in metabolic activation and repair. The identification of the structures of PAH-DNA adducts may be accomplished by three approaches: co-chromatography with synthetic mononucleotide adduct standards; examining the adducts resulting from metabolism of pathway intermediates; or by chemically blocking metabolic activation at specific sites on the PAH. Administration of putative metabolic intermediates of a PAH leads to enhanced formation of DNA adducts resulting from further activation along that pathway. Conversely, chemically blocking a bond or position on a PAH prevents adducts arising from activation at the site. By comparing the DNA adduct spectra generated by metabolite, blocked forms, and parent PAH administration, the pathways important in the metabolic activation of the PAH in each tissue may be deduced. Partial identification of these adducts may also be determined by co-chromatography with the reaction products of synthetic epoxides and defined polydeoxynucleotides, and more thorough identification by using synthetic DNA adduct standards. These approaches have all been successfully applied to studies of PAH activation, and are reviewed in the paper.

Keywords: *Metabolic activation, *Polycyclic aromatic hydrocarbons, DNA adducts, Phosphorus 32, Chromatography, Reference standards, Cytochrome P450, Rats.

PB93-106649/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Digital Topographic Approach to Modeling: The Distribution of Precipitation in Mountainous Terrain. Symposium paper.
Oregon State Univ., Corvallis.
C. Daly, and R. P. Neilson. 1992, 20p EPA/600/A-92/195
Proceedings of the Annual Meeting of the American Institute of Hydrology, Portland, OR. Sponsored by Corvallis Environmental Research Lab., OR.

The demand for precipitation fields on a regular grid is growing dramatically as ecological and hydrological models become increasingly linked to spatial representations. However, a lack of data, as well as a conceptual framework for orographic precipitation, has hindered the development of accurate precipitation grids for complex terrain. The paper presents an analytical model that distributed point measurements of monthly average precipitation to a regular grid at regional to continental scales.

Keywords: *Precipitation(Meteorology), *Mountains, Mathematical models, Hydrology, Spatial distribution, Periodic variations, Regional analysis, Orographic measurements, *Grids.

PB93-106656/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Glossary for Avian Conservation Biology. Symposium paper.
Fish and Wildlife Service, Jamestown, ND. Northern Prairie Wildlife Research Center.
R. R. Koford, J. B. Dunning, and C. A. Ribic. 1992, 15p EPA/600/A-92/196
Proceedings of the Training Workshop on Management and Status of Neotropical Migratory Birds, Estes Park, CO., 1992. Prepared in cooperation with Georgia Univ., Athens. Sponsored by Corvallis Environmental Research Lab., OR.

The glossary provides standard definitions for many of the terms used in avian conservation biology. Alternative definitions are numbered if more than one definition is used.

Keywords: *Dictionaries, *Birds, *Wildlife conservation, Biology, Definitions.

PB93-106664/REB PC **A02**/MF **A01**
Air Toxics: The Research Challenge of the 1990 Clean Air Act Amendments. Rept. for Nov 91-Sep 92.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
F. T. Princiotta, and D. G. McKinney. 1992, 9p EPA/600/A-92/197
See also DE92008708.

The paper describes (1) major provisions of Title III of the 1990 Clean Air Act Amendments (CAAAs) which formally established a new regulatory approach which would avoid past impediments and accelerate emission reductions, and (2) the research that the U.S. EPA has initiated to support state and federal regulatory officials as they implement the extensive new provisons of the CAAAs. Toxic emissions from stationary air pollution sources have been recognized as a national health problem for several decades. Unfortunately, a large percentage of these hazardous air pollutant (HAP) emissions have not been controlled because, between 1977 and 1990, the risk-based federal regulatory program to reduce them addressed only a few pollutants. Disputes between industry, the U.S. EPA, and environmental groups over health effects data, exposure levels, and what constitutes an ample margin of safety to protect the public health were the primary impediments to progress and limited the number of National Emission Standards for Hazardous Air Pollutants (NESHAPS) issued to only 10. The lack of progress toward reducing HAP emissions raised public concern and convinced Congress to design the modified approach.

Keywords: *Clean Air Act, *Air pollution abatement, *Toxic substances, Pollution regulations, Air pollution standards, Stationary sources, US EPA, Standards compliance, Design criteria, Implementation, National Emission Standards for Hazardous Air Pollutants.

PB93-106672/REB PC **A03**/MF **A01**
Results of U.S. EPA Research Waste Combustion Residues. Symposium paper.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
C. C. Wiles. Jun 92, 15p
Proceedings of the United States Conference on Municipal Solid Waste Management: Moving Ahead (2nd), Arlington, Virginia, June 2-5, 1992. See also PB90-187154, PB92-121177 and PB92-121185.

During the past several years, U.S. EPA's Risk Reduction Engineering Laboratory in Cincinnati, Ohio has supported research on the characterization, testing, treatment, and utilization of residues from combustion of municipal solid waste. These research projects include the evaluation of several solidification/stabilization (S/S) processes. Other research investigated the effects of MWC ash leachates on clay and geo-membrane liners. Leachates were used to evaluate the potential degradation to the liners as tested by U.S. Environmental Protection Agency (USEPA) methods 9100 and 9090. Results from these research projects and others will be summarized in this paper. In addition, the paper will discuss issues associated with utilization of the residues and the current research and demonstrations being conducted to resolve the issues.

Keywords: *Municipal wastes, *Residues, *Research and development, *Waste management, US EPA, Combustion, Waste disposal, Waste treatment, Waste utilization, Land pollution control, Leaching, Air pollution control, Pollution regulations, Solidification, Stabilization, Linings, Incineration.

PB93-106680/REB PC **A03**/MF **A01**
Technical Issues on Long-Term Performance of Solidified/Stabilized Waste Forms.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
P. M. Erickson, D. R. Kirk, and C. C. Wiles. 1992, 14p EPA/600/A-92/199
Proceedings of the Pacific Basin Conference on Hazardous Waste, Bangkok, Thailand, April 6-10, 1992.

The success of solidification and stabilization treatment of hazardous wastes depends on the ability of the treated waste to endure physical and chemical weathering without releasing trapped contaminants. The expected durability of treated wastes has been estimated from the results of laboratory tests, but has never been confirmed by field tests and application monitoring. The paper describes the status of estimating waste form durability and a proposed research program to improve prediction of the success of solidification/stabilization treatment. Current research projects are also summarized.

Keywords: *Hazardous materials, *Waste treatment, *Meetings, Metals, Stabilization, Estimates, Durability, Solidification.

PB93-106698/REB PC **A03**/MF **A01**
Landfill Containment and Cover Systems.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. E. Landreth. 1992, 14p EPA/600/A-92/200
Proceedings of the Pacific Basin Conference on Hazardous Waste, Bangkok, Thailand, April 6-10, 1992. See also PB87-132825, PB87-191656 and PB88-131263.

The U.S. Environmental Protection Agency through its research and field experiences has developed control strategies for hazardous and municipal solid waste landfills and surface impoundments. These control strategies include liner and cover systems. The liner systems include double liners for hazardous waste and a single composite liner for municipal solid waste. The purpose of each individual component will be discussed with options for using natural in-situ materials or geosynthetics. Although natural soils are used as various components, emphasis has been placed on the use of geosynthetics, including geomembranes, geonets, geotextiles, and plastic pipes. Cover systems for both hazardous and municipal waste facilities are based on a multilayer design. The multilayer component characteristics, including performance, thickness and material type will be discussed. These designs include both natural soils and geosynthetics. It has been demonstrated with field data that the development of construction quality control/quality assurance will improve the performance of the disposal facility. Current programs and techniques used in the United States will be discussed.

Keywords: *Earth fills, *Pollution control, *Waste disposal, *Linings, *Coverings, *Surface impoundments, Air pollution control, Land pollution control, Municipal wastes, Hazardous materials, Leaching, Performance evaluation, Design criteria, Soils, Geosynthetic materials.

PB93-106706/REB PC **A03**/MF **A01**
FLEX: An Expert System for Reviewing the Chemical Resistance of Flexible Membrane Liners for Waste Management.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. E. Landreth. 1992, 13p EPA/600/A-92/201
International Symposium on Environmental Geotechnology (2nd), Tongui University, Shanghai, China. See also PB88-249578.

A computerized, expert system (FLEX) has been developed that will assess the chemical resistance of flexible membrane liners (FML) used at waste management facilities. These FML's must be chemically resistant to the waste, its leachates, or both. To demonstrate chemical resistancy, the United States Environmental Protection Agency (USEPA) requires the use of Method 9090, wherein the physical properties of the FML are evaluated after various exposure times.

After the Method 9090 data are assembled, a reviewer is then responsible for assessing the data and reaching a conclusion about the probability that a proposed FML material will be resistant to the waste/leachate. Knowledgeable judgments as to the chemical resistance of FML require a multitude of considerations. Because such knowledge is not generally available within the USEPA, a computerized, expert system was sought to provide guidance in the review of Method 9090 data. The liner materials of interest were high-density polyethylene (HDPE), polyvinyl chloride (PVC), and chlorosulfonated polyethylene (CSPE).

Keywords: *Linings, *Waste management, *Expert systems, *Chemical resistance, *Materials tests, Physical properties, Performance evaluation, Leaching, Exposure, Membranes, Land pollution control, Computer systems programs, Polyvinyl chloride, Polyethylene, *FLEX system, Geosynthetic materials, EPA method 9090, High density polyethylene, Chlorosulfonated polyethylene.

PB93-106714/REB PC **A02**/MF **A01**
Resistance of Membranes in Cover Systems to Root Penetration by Grass and Trees.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. E. Landreth. 1992, 10p EPA/600/A-92/202
Pub. in Geosynthetics Conference, Atlanta, GA., February 26-28, 1991, v1 p303-309. See also PB86-176336.

Increased emphasis in being placed on multi-layered cover systems for waste management facilities to minimize the need for further maintenance and to minimize the infiltration of moisture into the unit. These cover systems contain geosynthetic materials that perform specific design, drainage and barrier functions. A major concern is long-term (greater than 30 years) performance of materials used, especially barrier materials. Grasses and woody plants planted or growing naturally on the cover may produce root systems capable of penetrating the barrier materials. The U.S. Environmental Protection Agency has undertaken a study to evaluate the resistance of commercially available membranes to the penetration force of grasses and trees.

Keywords: *Coverings, *Waste management, *Facilities, *Earth fills, Fluid infiltration, Barriers, Drainage, Maintenance, Membranes, Roots, Penetration, Pressure, Growth, Grasses, Trees(Plants).

PB93-106722/REB PC **A03**/MF **A01**
Landfill Containment Systems Regulations.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. E. Landreth. 1992, 11p EPA/600/A-92/203

The Congress of the United States, through the Resources Conservation and Recovery Act of 1976 (RCRA) and its 1984 Hazardous and Solid Waste Amendments (HSWA), mandated the United States Environmental Protection Agency (EPA) to develop standards for the management of both hazardous and nonhazardous wastes in the country in a manner that would protect human health and the environment. In response, the EPA through its experience in field activities and research developed interim guidelines. The regulations and guidance documents will continue to be updated as construction materials are improved and as design concepts are better understood and verified in the field.

Keywords: *Regulations, *Earth fills, Containment, Hazardous materials, Standards, Public health, Leaching, Design, Guidelines, Resource Conservation and Recovery Act of 1976.

PB93-106730/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Use of Ecoregions in Biological Monitoring. Symposium paper.
ManTech Environmental Technology International, Inc., Corvallis, OR.
R. M. Hughes, S. A. Heiskary, W. J. Matthews, and C. O. Yoder. 1992, 32p EPA/600/A-92/204
Pub. in Symposium on Biological Monitoring of Freshwater Ecosystems, West Lafayette, IN., November 29-December 1, 1990. Prepared in cooperation with Minnesota Pollution Control Agency, St. Paul, Oklahoma Univ., Kingston. Biological Station, and Ohio State Environmental Protection Agency, Columbus. Sponsored by Corvallis Environmental Research Lab., OR.

In order to better manage populations of lakes and streams it is useful to have some form of lake and stream classification. In biological monitoring programs, an appropriate geographic framework is useful for developing estimates of organisms likely to be collected and conditions likely to be encountered. As assemblage and water quality data bases and statistical software have become available, they have been used to frame regions. Others have compared aquatic ecosystem patterns with various environmental variables. The purpose of the paper is to compare fish faunal regions and ecoregions, summarize the experience of two states that use ecoregions as management units, and summarize the concerns of workshop participants about the use of ecoregions.

Keywords: *Ecology, *River basins, *Pollution control, *Meetings, Lakes, Streams, Classifications, Monitoring, Water quality data, Data bases, Aquatic biology, Fresh water biology, Ecoregions.

PB93-106748/REB PC **A03**/MF **A01**
EMAP and Other Tools for Measuring Biodiversity, Habitat Conditions, and Environmental Trends. Symposium paper.
Corvallis Environmental Research Lab., OR.
E. Preston, and C. A. Ribic. 1992, 14p EPA/600/A-92/205
Proceedings: National Training Workshop on Status and Management of Neotropical Migratory Birds, 1992.

Several research efforts that will contribute to assessment and monitoring of neotropical migratory birds are described, including: (1) the use of neotropical migrants in the Environmental Monitoring and Assessment Program (EMAP) as potential indicators of general environmental condition and biodiversity; (2) EPA's Habitat/Biodiversity Research Initiative to assess the comparative risks to biodiversity, including neotropical migrant birds; and (3) other EPA research to develop tools for assessing status and trends of neotropical migratory birds at various spatial scales.

Keywords: *Species diversity, *Birds, *Environmental monitoring, Animal migrations, Habitats, Risk assessment, Trends, Measurement, Wildlife, Neotropical.

PB93-106763/REB PC **A02**/MF **A01**
Asymmetric Loss Function for Superfund Remediation Decisions.
Environmental Monitoring Systems Lab., Las Vegas, NV.
G. T. Flatman, and E. J. Englund. 1992, 8p EPA/600/A-92/207
See also PB90-155581.

At a Superfund remediation site the decision is a classification problem, discriminating between polluted blocks to be remediated and background blocks to be left untreated. The concentration of the pollutant in a block is estimated from sampling. The more samples taken the better the estimates, but what is the optimum sample size. The errors are computed by subtracting the estimate from the block averages of an exhaustive sampling. The time-honored least squares algorithm is the obvious way to evaluate a given sample size, but least squares assumes a symmetric loss function. Superfund remediation has an asymmetric cost-plus-loss function; false positives (clean blocks judged dirty) have a relatively small fixed cost while false negative (polluted blocks judged clean) have public-health-losses that increase with concentration. Minimizing an asymmetric cost-plus-loss function will find a different optimum sample size than would the traditional least squares approach.

Keywords: *Superfund, *Remedial action, *Environmental monitoring, *Sampling, *Waste management, Concentration(Composition), Hazardous materials, Decision making, Asymmetry, Numerical analysis, Error analysis, Public health, Nomographs, Reprints, *Loss function, Cleanup operations.

PB93-106771/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Modeling of Indoor Air Quality for a Personal Computer. Rept. for Jul 91-Jan 92.
Research Triangle Inst., Research Triangle Park, NC.
T. Yamamoto, D. Ensor, and L. Sparks. 1992, 16p EPA/600/A-92/208
Grant EPA-R-817083
Presented at ASTM Symposium on Modeling Indoor Air Quality Exposure, Pittsburgh, PA., April 26-28, 1992. See also PB91-205153 and PB91-205161. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses a menu-driven ventilation model for a personal computer (PC), developed to determine the distributions of time-averaged flow fields and particulate or gaseous contaminants under isothermal conditions and for a given effective turbulent diffusion coefficient. The model was written for a PC so that engineers can use it as a tool to evaluate a potential ventilation performance in indoor space yet to be designed. The model's computational speed is extremely fast (a few minutes) with reasonable accuracy. This paper discusses the computational algorithm and user interactiveness for the use of this model. Case studies were performed for a simple indoor environment. Ventilation effectiveness in relation to the locations of the supply air duct and the contaminant source was investigated.

Keywords: *Indoor air pollution, *Air quality, *Computerized simulation, *Ventilation, Mathematical models, Performance evaluation, Case studies, Air flow, Turbulence, Personal computers, Air pollution sampling, Diffusion.

PB93-106789/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Validation of Source and Sink Models: Problems and Possible Solutions. Rept. for Sep 91-Apr 92.
Acurex Environmental Corp., Research Triangle Park, NC.
Z. Guo. 1992, 33p EPA/600/A-92/209
Contract EPA-68-DO-0141
Presented at Symposium on Modeling of Indoor Air Quality and Exposure, Pittsburgh, PA., April 27-28, 1992. See also DE85001212. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses solutions for problems relating to validating indoor air quality (IAQ) source and sink models. While model validation remains the weakest part of the entire process of IAQ model development, special problems have made the validation of indoor source and sink models even more difficult. Many source and sink models have been developed, but few have been properly validated. Major problems include: elusive model parameters, confusion in parameter estimation methods, uncertainty in scale-up and misleading scaling factors, unspecified validity ranges, and weakness in quantitative comparisons between models and experimental observation. Possible solutions include: proper definition of validation scope, proper use of statistical comparison methods, development of mass transfer indices to bridge the gap between test chambers and real buildings, and development of a cooperative effort to build a source and sink database to facilitate validation.

Keywords: *Indoor air pollution, *Air quality, *Mathematical models, *Pollution sources, *Sinks, Validation, Comparison, Test chambers, Statistical analysis, Buildings, Performance evaluation, Environmental transport.

PB93-106797/REB PC **A03**/MF **A01**
ASHRAE Standard 62: Ventilation for Acceptable Indoor Air Quality. Rept. for Jan-Aug 92.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
W. G. Tucker. c1992, 12p EPA/600/A-92/210
Presented at the International J. Cartier Conference, Indoor Air Quality, Montreal, Canada, October 7-9, 1991. See also DE92-000909.

The paper highlights some of the key features of the design procedures in ASHRAE Standard 62 (Ventilation for Acceptable Indoor Air Quality) and summarizes the status of the related review process. The Standard contains design procedures and guidelines for ventilation rates in 'all indoor or enclosed spaces that people may occupy, except where other applicable standards and requirements dictate larger amounts of ventilation than this standard.' It is the basis for ventilation re-

quirements in many codes for commercial, institutional, and residential buildings in North America. The Standard is reviewed every 5 years or less, and updated as needed to incorporate new information or improve its usefulness to building designers and code officials.

Keywords: *Air quality, *Ventilation, *Air pollution standards, *Indoor air pollution, Buildings, North America, Stationary sources, Design criteria, Guidelines, Performance standards.

PB93-106805/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Fluorinated Ethers: A New Series of CFC Substitutes. Rept. for Aug 88-Oct 91.
Tennessee Univ., Knoxville. Dept. of Chemistry.
J. L. Adcock, S. B. Mathur, W. A. VanHook, H. Q. Huang, and M. Narkhede. 1991, 12p EPA/600/A-92/211
Grant EPA-R-815147
Presented at the International CFC and Halon Alternatives Conference, Baltimore, MD., December 3-5, 1991. Prepared in cooperation with Electric Power Research Inst., Palo Alto, CA. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses fluorinated ethers, a new series of chlorofluorocarbon (CFC) substitutes. Compounds synthesized to produce substances with suitable refrigerant properties have generally left out sulfur, nitrogen, and oxygen. The general result is that all currently proposed substitutes for CFC and halon replacements have been alkanes. Because of the limited number of compounds of these elements having suitable properties and the current decision to phase out CFCs and (eventually) hydrochlorofluorocarbons (HCFCs), restricting the search to alkanes only is no longer tenable. Consideration of fluorinated ethers effectively doubles the potential list of contenders. The fact that divalent oxygen in a fluorocarbon chain has only a modest effect on vapor pressure, compared to the alkane of similar carbon number and substitution, should be a strong incentive to investigate these compounds. Several new fluorinated compounds have been synthesized and characterized. Additionally, several compounds for which data were not available were synthesized. These compounds, both new and two 'revisited' ones, could function as replacement working fluids in many applications requiring similar properties. Without chlorine, all have zero ozone depletion potential.

Keywords: *Ethers, *Fluorine organic compounds, *Substitutes, *Air pollution control, Fluorohydrocarbons, Ozone, Refrigerants, Vapor pressure, Chemical reactions, Thermodynamic properties, Halohydrocarbons, Fluorination, *Fluorinated ethers.

PB93-106813/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Fluorinated Ethers: A New Family of Halons. Rept. for Feb 90-Oct 91.
Tennessee Univ., Knoxville. Dept. of Chemistry.
J. L. Adcock, S. B. Mathur, H. Q. Huang, P. Mukhopadhyay, and B. H. Wang. 1991, 12p EPA/600/A-92/212
Grant EPA-R-815147
Presented at the International CFC and Halon Alternatives Conference, Baltimore, MD., December 3-5, 1991. See also PB93-106805. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses the possibility of fluorinated ethers' being a new family of halons. Work at the University of Tennessee to find suitable replacements for fully halogenated chlorofluorocarbons (CFCs) and halons has centered on the incorporation of oxygen as a heteroatom. The most stable class of compounds, fluorinated ethers, potentially doubles the number of candidates versus just the halogenated alkanes, with minimal change in physical properties. The first comparison of compounds involves the dimethyl ether series of compounds which provide substitutionally similar analogs to ethanes. The synthesis, characterization, and physical properties of all of the perfluorinated ethers are discussed briefly and their extinguishment concentrations are tabulated. The work indicates that the mechanism by which perfluorocarbons achieve their flame extinguishment capability is rooted more in the ability to dissipate the energy of free radicals and permit their recombindation, than it is by any bond dissociative or other purely chemical mechanism. This implies that, in the absence of overriding chemical effects (bromine), there should be a correlation between infrared absorptivity and extinguishant effectiveness.

Keywords: *Ethers, *Fluorine organic compounds, *Substitutes, *Air pollution control, Ozone, Fluorination, Chemical reactions, Halohydrocarbons, Fire extinguishing agents, Molecular spectra, *Fluorinated ethers.

PB93-106821/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Thermodynamic Performance Limit and Evaporator Design Considerations for NARM-Based Domestic Refrigerator-Freeze Systems. Rept. for Aug 89-May 90.
Illinois Univ. at Urbana-Champaign. Dept. of Mechanical and Industrial Engineering.
M. K. Smith, M. C. Heun, R. R. Crawford, and T. A. Newell. 1990, 14p EPA/600/A-92/213
Grant EPA-R-816206
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results of an investigation of non-azeotropic refrigerant mixtures (NARMs) for a two-temperature-level heat exchange process found in a domestic refrigerator-freezer. Ideal (constant air temperature) heat exchange processes are assumed. The results allow the effects of intercooling between the evaporator refrigerant stream and the condenser outlet stream to be examined systematically. Three refrigerant pairs, R22/R142b, R22/R123, and R32/R142b, were studied, but the results for only R22/R123 are presented because of its unique temperature glide curvature. Practical implementation of a Lorenz cycle constrains evaporator design. An evaporator module design is presented which meets the NARM system constraints.

Keywords: *Refrigerants, *Refrigerators, *Freezers, *Pollution control, Evaporation, Thermodynamic properties.

PB93-106839/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Use of Surface-Coating-Free Materials for Reduction of Volatile Organic Compound Emissions from Coating Operations. Rept. for Dec 90-Jul 91.
Research Triangle Inst., Research Triangle Park, NC.
C. M. Northeim, M. W. Moore, and M. Kosusko. 1992, 14p EPA/600/A-92/214
Grant EPA-R-815169
Presented at World Clean Air Congress (9th), Montreal, Quebec., August 30-September 4, 1992. See also PB91-119669 and PB92-206614. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses results from a July 1991 workshop and the progress that has been made in advancing the technology of surface-coating-free materials (SCFMs). The workshop identified opportunities for the development of SCFMs being used by industries and recommended ways for increasing the use of SCFMs by other industries. In addition, the workshop offered the opportunity for the exchange and the development of innovative concepts related to SCFMs. Coating operations release about 15% of stationary area source volatile organic compound (VOC) emissions. Many of these sources cannot be impacted by add-on controls at a reasonable cost due to their small size and/or the difficulty of capturing emissions. In addition, not only do emissions occur during initial coating, they occur each time the surface is recoated. If materials or products could be developed which do not need coating during either manufacture or use (SCFMs), VOC emissions could be reduced significantly. The U.S. ambient air quality standard for ozone (0.12 ppm) is exceeded in over 100 areas in the country. Extensive reduction of VOC emissions is required for attainment. The difficulty of dealing with stationary area sources has been a major obstacle to attaining these reductions. Area sources may contribute as much as 50% of U.S. VOC emissions.

Keywords: *Volatile organic compounds, *Air pollution abatement, *Meetings, Substitutes, Coating processes, Air pollution standards, Stationary sources, Performance evaluation, Technology utilization, Construction materials, Market value, Product development, *Surface coating free materials.

PB93-106847/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
On-Line Measurement of Nitrous Oxide from Combustion Sources by Automated Gas Chromatography. Rept. for Jun 90-Jun 92.
Acurex Environmental Corp., Research Triangle Park, NC.
J. V. Ryan, and W. P. Linak. 1992, 15p EPA/600/A-92/215
Contract EPA-68-DO-0141
Presented at the International Workshop on Nitrous Oxide Emissions (5th), Tsukuba, Japan, July 1-3, 1992. See also PB89-166623 and PB90-238502. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses on-line measurement of nitrous oxide (N2O) from combustion sources by automated gas chromatography. Fossil fuel combustion is suspected of contributing to measured increases in the ambient concentrations of N2O. Characterization of N2O emissions from fossil fuel combustion and associated pollution control systems has been hindered by the generation of N2O from nitrogen oxides, sulfur dioxide, and moisture present in the sample vessel while samples await analysis. To truly assess N2O emissions from fossil fuel combustion, a real-time or near real-time measurement technique is required. To accomplish this, a gas chromatograph equipped with an electron capture detector was configured and automated. The system is capable of detection levels below ambient concentrations and a practical quantifying range of 0.1 to 200 ppm. A precolumn backflushing system negates the effects of interferents present in fossil fuel combustion emissions. The automated system, capable of one on-line measurement every 8 minutes, has been used to evaluate N2O emissions from a variety of combustion sources, fuels, and post-combustion pollution control techniques.

Keywords: *Air pollution detection, *Nitrogen oxide(N2O), *Combustion products, *Gas chromatography, Air pollution control, Chemical analysis, Fossil fuels, Electron-capture detectors, Automation, Performance evaluation.

PB93-106854/REB PC **A03**/MF **A01**
Technologies Options for Acid Rain Control. Book chapter.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
F. T. Princiotta. 1992, 22p EPA/600/A-92/216

The report discusses acid rain control options available to the electric utility industry. They include coal switching, flue gas desulfurization, and such emerging lower cost technologies as Limestone Injection Multistage Burners (LIMB) and Advanced Silicate (ADVACATE), both developed by EPA, selective use of gas to reduce nitrogen oxides (NOx) and sulfur dioxide (SO2) in coal-fired boilers, and the use of Integrated Coal Gasification Combined Cycle (IGCC) technology.

Keywords: *Precipitation(Meteorology), *Pollution control, *Acidification, Electric power plants, Public utilities, Coal gasification, Flue gas, Desulfurization, Reduction, Nitrogen oxides, Limestone, Boilers, Coal fired power plants, Calcium silicates, Sulfur dioxide, Acid rain.

PB93-106862/REB PC **A03**/MF **A01**
Microbial Transformation of Selected Organic Chemicals in Natural Aquatic Systems.
Environmental Research Lab., Athens, GA.
N. D. Ananyeva, N. N. Naumova, J. E. Rogers, and W. C. Steen. c1992, 22p EPA/600/A-92/217
Pub. in Fate of Pesticides and Chemicals in the Environment, p275-294 1992.

A method for describing the microbial degradation of xenobiotics through the use of a second-order reaction equation was tested in several water bodies in the United States and Russia. The experiment was aimed at studying the microbial transformation of a herbicide widely used in rice growing, propanil; of a promising new fungicide, metalaxyl; and of phenol and p-cresol.

The method described, in a satisfactory way, the process of microbial degradation of potentially toxic chemicals undergoing hydrolytic or oxidative transformation. Prediction of the fate of persistent compounds, like metalaxyl, is difficult, however. A data bank of second-order rate constants for organic chemicals would permit the prediction of contaminant fate in any natural water source. Such predictions would be important for assessing contaminant fate and exposure in natural waters.

Keywords: *Microorganisms, *Degradation, *Pesticides, *Aquatic biology, Toxicity, Organic compounds, Chemical reactions, Mathematical models, Propanil, Matalaxyl, Xenobiotics.

PB93-106870/REB PC A03/MF A01
Sources and Sinks of Radiatively Important Trace Gases in the Biosphere.
Environmental Research Lab., Athens, GA.
J. E. Rogers, D. L. Lewis, L. A. Burns, R. R. Lassiter, and R. G. Zepp. 1989, 16p EPA/600/A-92/218
Pub. in Proceedings of Annual Meeting and Exhibition of Air and Waste Management Association (82nd), Anaheim, CA., June 25-30, 1989 p1-14.

The overall goals of process-level investigations of the sources and sinks of trace gases are to improve capabilities to: (1) determine both current and potential global contributions of biogeogenic versus anthropogenic sources, including possible feedbacks resulting from global change; and (2) evaluate the effects of various remediation options, including controls of emissions and land use mechanisms. The results of the research will be incorporated into mathematical models that can be used to predict the net fluxes of the gases as a function of various hypothesized land uses or climate scenarios. To accomplish these goals, process-level investigations in the laboratory and field will focus on developing fundamental functions that quantify the effects of changes in climate and stratospheric ozone on the biogeochemical dynamics of the gases.

Keywords: *Climatic changes, *Biosphere, Mathematical models, Land use, Field tests, Ozone, Stratosphere, Sources, *Trace gases, Global, Sinks.

PB93-106888/REB PC A03/MF A01
Environmental Research Lab., Athens, GA.
STREAM: An Exposure Assessment Methodology for Agricultural Pesticide Runoff.
AQUA TERRA Consultants, Mountain View, CA.
A. S. Donigian, and L. A. Mulkey. c1992, 37p EPA/600/A-92/219
Contract EPA-68-03-3116
Pub. in Fate of Pesticides and Chemicals in the Environment, p297-330 1992. See also PB86-199882 and PB86-199890.Portions of this document are not fully legible. Sponsored by Environmental Research Lab., Athens, GA.

Exposure assessments for pesticides used in agriculture require the estimation of both pesticide runoff from fields and resulting concentrations in streams in order to predict the potential aquatic and/or health risk posed by pesticide usage. The STREAM procedures provide a methodology for estimating the mean, maximum, frequency and duration of pesticide concentrations, and the maximum daily and frequency of pesticide runoff for various agricultural crops and regions across the country. STREAM is designed for screening level analyses to provide the order of magnitude accuracy appropriate for exposure assessment with minimal investment in time and resources. Crops included in the current version of STREAM are corn, soybeans, cotton, wheat, and sorghum. (Copyright (c) 1992 John Wiley & Sons, Inc.)

Keywords: *Pesticides, *Agricultural runoff, *Water pollution sampling, Exposure, Agricultural chemicals, Path of pollutants, Environmental transport, Aquatic biology, Public health, Concentration(Composition), Farm crops, Regional analysis, Watersheds, Reprints, *STREAM procedures, Registration.

PB93-106896/REB PC A03/MF A01
Effect of Molecular Oxygen on the Scaleup of GAC Adsorbers. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. D. Vidiv, G. A. Sorial, S. P. Papadimas, M. T. Suidan, and T. F. Speth. c1992, 12p EPA/600/J-92/342
Pub. in Jnl. American Water Works Association, p98-105 Aug 92.

A rapid small-scale column test (RSSCT), designed according to the assumption of no dependency of the intraparticle surface diffusion coefficient on the activated carbon particle size, was able to accurately predict breakthrough of three volatile organic chemicals as well as background organic matter under both oxic and anoxic conditions. A second RSSCT, however,--designed assuming a linear dependency of the intraparticle surface diffusion coefficient on the activated carbon particle size--significantly overestimated the adsorptive capacity attainable from the large-column tests. The presence of molecular oxygen in the test environment increased the adsorptive capacity of activated carbon for background organic matter, yielding a delay in its breakthrough from an adsorber. Because of the increased capacity for background organic matter, the resultant capacity for volatile organic chemicals decreased because of competitive effects.

Keywords: *Adsorbents, *Activated carbon process, *Water purification, Pilot plants, Comparison, Performance evaluation, Simulation, Particle size, Anoxic, Organic matter, Oxygen, Volatile organic compounds, Tests, Reprints, Trichloroethene.

PB93-106904/REB PC A02/MF A01
Corvallis Environmental Research Lab., OR.
Effect of Aerosolization on Subsequent Bacterial Survival. Journal article.
NSI Technology Services Corp., Corvallis, OR.
M. V. Walter, B. Marthi, V. P. Fieland, and L. M. Ganio. c1992, 7p EPA/600/J-92/343
Pub. in Applied and Environmental Microbiology, v56 n11 p3468-3472 1990. See also PB91-177147. Sponsored by Corvallis Environmental Research Lab., OR.

To determine whether aerosolization could impair bacterial survival, Pseudomonas syringae and Erwinia herbicola were aerosolized in a greenhouse, the aerosol was sampled at various distances from the site of release by using all-glass impingers, and bacterial survival was followed in the impingers for 6 h. Bacterial survival subsequent to aerosolization of P. syringae and E. herbicola was not impaired 1 m from the site of release. P. syringae aerosolized at 3 to 15 m from the site of release at a temperature of 12 deg C and a relative humidity of 80% survived 35- to 65-fold better than P. syringae released at 27 deg C and a relative humidity of 40%. No difference was observed in the survival of P. syringae and E. herbicola following aerosolization at the same temperature and relative humidity. Bacteria sprayed directly onto bean and oat plants established stable populations at comparable numbers on both plants over an 8-day period following inoculation. Bacteria that inoculated adjacent plants by drifting downwind up to 5 m were detectable at an initial population of 100 CFU/g on oats and 100,000 CFU/g on beans 2 h after the spray. However, bacterial populations on both plants were undetectable within 48 h. (Copyright (c) 1990, American Society for Microbiology.)

Keywords: *Aerosols, *Bacteria, *Survival analysis, Survival, Farm crops, Plants(Botany), Ambient temperature, Humidity, Reprints, *Pseudomonas syringae, *Erwinia herbicola.

PB93-106912/REB PC A01/MF A01
Biodiversity and Management of Natural Resources: The Issues. Journal article.
Corvallis Environmental Research Lab., OR.
M. A. Cairns, and R. T. Lackey. c1992, 5p EPA/600/J-92/344
Pub. in Fisheries, v17 n3 p6-10 1992. See also PB91-155242.

The Earth's wealth of genetic, species, community, and landscape-level diversity is disappearing at an unprecendented rate because of humanity's ever-accelerating alteration of habitat. The loss of biodiversity in the aquatic environment is now recognized as a serious concern by aquatic biologists. Development and use of our natural resources have been practiced in an unsustainable manner. Political institutions have been challenged to reconcile competing private and public goals, as well as a diverse set of expectations of our natural resources, including aquatic systems. This paper defines biodiversity, identifies many values of diversity in the biosphere, and discusses both proximate and ultimate causes of its decline.

Keywords: *Species diversity, *Natural resources, Aquatic ecosystems, Environmental protection, Economic analysis, Fisheries, Government policies, Reprints, *Biodiversity.

PB93-106920/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Modelling Epicodic Acidification of Surface Waters: The State of Science. Journal article.
Virginia Univ., Charlottesville. Dept. of Environmental Sciences.
K. N. Eshleman, P. J. Wigington, T. D. Davies, and M. Tranter. c1992, 11p EPA/600/J-92/345
Pub. in Environmental Pollution, v77 p287-295 1992. Prepared in cooperation with University of East Anglia, Norwich (England). School of Environmental Sciences, and Southampton Univ. (England). Dept. of Oceanography. Sponsored by Corvallis Environmental Research Lab., OR.

Field studies of chemical changes in surface waters associated with rainfall and snowmelt events have provided evidence of episodic acidification of lakes and streams in Europe and North America. A wide range of mathematical models have been applied to the problem of predicting transient, episodic acidification of surface waters in a variety of locations. This paper provides a review of mathematical models that have been applied to the problem.

Keywords: *Water pollution, *Surface waters, *Acidification, *Mathematical models, Air water interactions, Rainfall, Air pollution, Lakes, Streams, Reviews, Deposition, Snowmelt, pH, State of the art, Water chemistry, Reprints.

PB93-106938/REB PC A02/MF A01
Corvallis Environmental Research Lab., OR.
Mathematical Model of Plant Uptake and Translocation of Organic Chemicals: Development of the Model. Journal article.
Oregon State Univ., Corvallis. Dept. of Soil Science.
F. T. Lindstrom, L. Boersma, and C. McFarlane. c1991, 9p EPA/600/J-92/346
Pub. in Jnl. of Environmental Quality, v20 p129-136 1991. Sponsored by Corvallis Environmental Research Lab., OR.

Uptake, transport, and accumulation of organic chemicals by plants are influenced by characteristics of the plant and properties of the chemical, soil, and environmental conditions. A mathematical model was formulated which, when adequately tested, can be used to provide information about potential contamination. The model consists of one root compartment, one stem compartment, and three leaf compartments - each compartment subdivided into xylem, phloem, and storage. Chemical uptake is modeled from the soil solution to the root surface, through the apparent free space, endodermis into the xylem and throughout the plant. This article shows formulations of the mass balance equations, which lead to the complete system of equations that describe uptake. The solution gives chemical mass in each compartment as a function of time. The mathematical development yielded a well-defined concept of uptake, in-plant transport, and local accumulation of organic chemicals by plants.

Keywords: *Mathematical models, *Plants(Botany), *Organic compounds, Roots, Soil chemistry, Xenobiotics, Transpiration, Reprints.

PB93-106946/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Mathematical Model of Plant Uptake and Translocations of Organic Chemicals: Application to Experiments. Journal article.
Oregon State Univ., Corvallis. Dept. of Soil Science.
L. Boersma, C. McFarlane, and F. T. Lindstrom. c1991, 12p EPA/600/J-92/347
Pub. in Jnl. of Environmental Quality, v20 p137-146 1991. See also PB93-106938. Sponsored by Corvallis Environmental Research Lab., OR.

Uptake, transport, and accumulation of organic chemicals by plants are influenced by characteristics of the plant and properties of the chemical, soil, and environmental conditions. A mathematical model for uptake of organic chemicals by plants was calibrated by application to data from experiments in which the uptake of bromacil (C6H13BrN2O2) by soybean (Glycine max (L.) Merr.) plants was measured. The model was initial-

ly formulated by defining a generic plant as a set of adjacent compartments representing the major pools and pathways involved in transport and accumulation of water solutes. For this application the plant consists of one root, three stem, and three leaf compartments, with each compartment being subdivided into xylem, phloem, and storage. The model was calibrated with respect to storage coefficients that quantify rate of transport to and from storage. The model satisfactorily predicted the observed uptake and distribution patterns for bromacil in soybean plants at the stage of growth and under the environmental conditions of the experiments.

Keywords: *Mathematical models, *Plants(Botany), *Organic compounds, Soil chemistry, Transpiration, Roots, Soybeans, Leaves(Botany), Reprints, Glycine max, Bromacil.

PB93-106953/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Introduction to Nonpoint Source Pollution and Wetland Mitigation. Journal article.
Minnesota Univ., St. Paul. Water Resources Research Center.
L. A. Baker. c12 Sep 91, 37p EPA/600/J-92/348
Pub. in Ecological Engineering, v1 p1-26 1992. Sponsored by Corvallis Environmental Research Lab., OR.

Nonpoint source pollution (NPS) is the major cause of impairment of U.S. surface waters. Erosion from croplands has been declining but is not yet reflected in decreased sediment yield or phosphorus concentrations in the nation's rivers. Nitrogen pollution is of particular concern in eutophication of estuaries as a contaminant of groundwater, and as an acidifying agent in atmospheric deposition. Nitrogen fertilizer and emissions of nitrous oxides are major contributors to the problem. The outlook on pesticides is mixed: bans on organochlorine pesticides in the 1970s have resulted in decreasing concentrations in fish tissue; however, herbicides are now a problem for some surface and groundwater sources of drinking water, especially in the Upper Midwest.

Keywords: *Water pollution, *Surface waters, *Estuaries, Fertilizers, Nitrogen, Pesticides, Concentration(Composition), Phosphorus, Herbicides, Chlorine organic compounds, Ground water, Metals, Monitoring, Trends, Reduction, *Wetlands, Nonpoint sources, Eutrophication.

PB93-106961/REB PC **A02**/MF **A01**
Forest Management in Russia: Challenges and Opportunities in the Era of Perestroika. Journal article.
Corvallis Environmental Research Lab., OR.
O. N. Krankina, and R. K. Dixon. c1992, 8p EPA/600/J-92/349
Pub. in Jnl. of Forestry, p29-34 Jun 92.

The Russian Federation of the Commonwealth of Independent States, formerly the Union of Soviet Socialist Republics (USSR), occupies one-sixth of the world's land area. Approximately one-fourth of the world's timber resources and over half of all boreal forests are located there. The history of forest management in Russia covers nearly 400 years, with particularly dramatic changes occurring after the Socialist Revolutions of 1917 and 1991. After decades of forest resource exploitation and degradation, numerous changes in the forest sector provide opportunities for sustainable resource management. Recent changes, known as perestroika and glasnost, have created opportunities for new developments in Russian forest management and for international cooperation in the field of forestry.

Keywords: *Air pollution, *Forest management, *Russia, Structural timber, Degradation, Natural resource management, International cooperation, Perestroika, Glasnost.

PB93-106979/REB PC **A03**/MF **A01**
Developmental Toxicity of Inhaled Methanol in the CD-1 Mouse, with Application of Quantitative Dose-Response Modeling for Estimation of Benchmark Doses. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Perinatal Toxicology Branch.
J. M. Rogers, M. L. Mole, N. Chernoff, B. D. Barbee, and C. I. Turner. c1992, 37p EPA/600/J-92/350

Pregnant CD-1 mice were exposed to 1,000, 2,000, 5,000, 7,500, 10,000 or 15,000 ppm on methanol for 7 hr/day on days 6-15 of gestation. On day 17 of gestation, remaining mice were weighed, killed and the gravid uterus was removed. Numbers of implantation sites, live and dead fetuses and resorptions were counted, and fetuses were examined externally and weighed as a litter. Half of each litter was examined for skeletal morphology and the other half of each litter was examined for internal soft tissue anomalies using a freehand scalpel dissection. Significant increases in the incidence of exencephaly and cleft palate were observed at 5,000 ppm and above, increased postimplantation mortality at 7,500 ppm and above (including an increasing incidence of full-litter resorption), and reduced fetal weight at 10,000 ppm and above. A dose-related increase in cervical ribs or ossification sites lateral to the seventh cervical vertebra was significant at 2,000 ppm and above. The results of the study indicate that inhaled methanol is developmentally toxic in the mouse at exposure levels which were not maternally toxic. Litters of pregnant mice gavaged orally with 4 g methanol/kg displayed developmental toxic effects similar to those seen in the 10,000 ppm methanol exposure group.

Keywords: *Toxicity, *Methanol, *Teratogenic compounds, Cleft palate, Mice, Dose-response relationships, Congenital abnormalities, Fetus, Maternal-fetal exchange.

PB93-106987/REB PC **A02**/MF **A01**
Technology for Reduction of CO2 Emissions from the Transportation Sector. Journal article Mar 91-Jan 92.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
R. H. Borgwardt. c1992, 9p EPA/600/J-92/351
Pub. in Energy Convers. Mgmt., v33 n5-8 p443-449 1992. See also PB92-153733.

The article gives results of a preliminary assessment of the Hydrocarb Process which indicates that substantially more fuel energy can be produced--and at lower cost--than other current options for mitigating carbon dioxide (CO2) from mobile sources. The incremental cost of eliminating net CO2 emissions is estimated at $0.05 per gallon (3.78 liters) of gasoline displaced by methanol. About 80% reduction should be achievable at no incremental cost. It is concluded that, by sequestering byproduct carbon and replacing petroleum fuels with biomass-derived methanol, the Hydrocarb process can nullify the net effect of CO2 emissions from motor vehicles.

Keywords: *Air pollution abatement, *Alternative fuels, *Exhaust emissions, *Carbon dioxide, Biomass, Methyl alcohol, Energy source development, Motor vehicles, Assessments, Mobile pollutant sources, Reprints, Hydrocarb process.

PB93-106995/REB PC **A03**/MF **A01**
Decision Model for Biomarkers of Exposure. Journal article.
Environmental Monitoring Systems Lab., Las Vegas, NV. Exposure Assessment Research Div.
D. K. Stevens, R. J. Bull, C. H. Nauman, and J. N. Blancato. c1991, 13p EPA/600/J-92/353
Pub. in Regulatory Toxicology and Pharmacology, v14 p286-296 1991. Presented at the EPA/A and WMA Symposium on Total Exposure Assessment Methodology, Las Vegas, NV., November 27-30, 1989. Prepared in cooperation with Washington State Univ., Pullman. Coll. of Pharmacy.

The quantitation of exposure is one of the most critical elements of the risk assessment process. Contemporary risk assessment models rely on monitoring the target chemical in various environmental media and incorporate a variety of assumptions to estimate this. Recently, biomarkers have been advanced to improve estimates of the delivered dose of a given chemical or mixture of chemicals. A biomarker of exposure may be defined as an indicator of exposure to an environmental pollutant within the exposed organism, which becomes manifest before any adverse effects are evident. Measurement of such a biomarker within a biological system may potentially be used to identify and quantitate directly exposure to hazardous substances. The paper describes a decision model for the selection, evaluation, and validation of a biomarker of exposure. (Copyright (c) 1991 Academic Press, Inc.)

Keywords: *Markers, *Exposure, *Pollution, Microorganisms, Assessment, Monitoring, Mathematical models, Epidemiology, Toxicity, Decision making, Selection, Dosage, Chemical properties, Biomarkers, Chemicals.

PB93-107001/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Global Inventory of Volatile Organic Compound Emissions from Anthropogenic Sources. Journal article Mar 88-Sep 90.
Science Applications International Corp., Durham, NC.
S. D. Piccot, J. J. Watson, and J. W. Jones. c1992, 18p EPA/600/J-92/354
Contracts EPA-68-02-4274, EPA-68-D9-0173
Pub. in Jnl. Geophysical Research, v97 nD9 p9897-9912, 20 Jun 92. See also PB91-161687, PB91-119669 and PB88-225792. 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 paper discusses the development of a global inventory of anthropogenic volatile organic compound (VOC) emissions. It includes VOC estimates for seven classes of VOCs: paraffins, olefins, aromatics (benzene, toluene, xylene), formaldehyde, other aldehydes, other aromatics, and marginally reactive compounds. These classes represent general classes of VOC compounds that possess different chemical reactivities in the atmosphere. The inventory shows total global anthropogenic VOC emissions of about 110,000 Gg/yr, about 10% lower than global VOC inventories developed by other researchers. The study identifies the U.S. as the largest emitter (21% of the total global VOC), followed by the USSR, China, India, and Japan. Globally, fuel wood combustion and savanna burning were among the largest VOC emission sources, accounting for over 35% of the total global VOC emissions. The production and use of gasoline, refuse disposal activities, and organic chemical and rubber manufacturing were also found to be significant sources of global VOC emissions.

Keywords: *Volatile organic compounds, *Air pollution, *Environmental impact assessments, Global aspects, Pollution sources, Geographic distribution, Emission factors, Maps, Ozone, Alkene hydrocarbons, Alkanes, Aromatic compounds, Formaldehyde, Aldehydes, Atmospheric chemistry, Climatic changes, Reprints, *Emission inventories.

PB93-107019/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC.
Airborne Particle Sizes and Sources Found in Indoor Air. Journal article.
Research Triangle Inst., Research Triangle Park, NC. Center for Aerosol Technology.
M. K. Owen, D. S. Ensor, and L. E. Sparks. c1992, 16p EPA/600/J-92/355
Grant EPA-R-814169
Pub. in Atmospheric Environment, v26A n12 p2149-2162 1992. See also PB91-191171. Sponsored by Environmental Protection Agency, Research Triangle Park, NC.

The article summarizes results of a literature search into the sources, sizes, and concentrations of particles in indoor air, including the various types: plant, animal, mineral, combustion, home/personal care, and radioactive aerosols. This information, presented in a summary figure, has been gathered for use in designing test methodologies for air cleaners and other mitigation approaches and to aid in the selection of air cleaners. (NOTE: As concern about indoor air quality has grown, understanding indoor aerosols has become increasingly important so that control techniques may be implemented to reduce damaging health effects and soiling problems. Particle diameters must be known to predict dose or soiling and to determine efficient mitigation techniques.)

Keywords: *Indoor air pollution, *Particle size, *Pollution sources, *Air pollution control, *Aerosols, Air quality, Air pollution sampling, Concentration(Composition), Radioactive materials, Environmental transport, Air cleaners, Mitigation, Public health, Tables(Data), Reprints.

PB93-107027/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Modeling of the Fast Organic Emissions from a Wood-Finishing Product: Floor Wax. Journal article.
Acurex Corp., Research Triangle Park, NC.
J. C. S. Chang, and Z. Guo. c1992, 8p EPA/600/J-92/356
Contract EPA-68-D0-0141
Pub. in Atmospheric Environment, v26A n13 p2365-2370 1992. See also PB91-205153. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses environmental chamber and full-scale residential house tests conducted to characterize the fast organic emissions from a wood finishing product, floor wax. For the environmental chamber tests, a very small amount (< 5 g/sq m) of the wax was applied to an aluminum plate. It was found that the chamber exit organic concentrations can be estimated by a model with an initial condition of instant organic emissions. The model was applied to the house data to interpret the octane and nonane emissions. Significant sink effects were found in the house that prolonged the elevated octane and nonane concentrations for more than 2 days.

Keywords: *Indoor air pollution, *Mathematical models, *Waxes, *Air pollution sampling, *Volatile organic compounds, Pollution sources, Floors, Air quality, Houses, Wood products, Concentration(Composition), Test chambers, Reprints.

PB93-107035/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Evaluation of Para-Dichlorobenzene Emissions from Solid Moth Repellant as a Source of Indoor Air Pollution. Journal article.
Acurex Environmental Corp., Research Triangle Park, NC.
J. C. S. Chang, and K. A. Krebs. c1992, 6p EPA/600/J-92/357
Contract EPA-68-D0-0141
Pub. in Air and Waste Management Association, v42 n9 p1214-1217. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper reports results of dynamic and static chamber tests to evaluate para-dichlorobenzene emission rates from mothcakes. The data were analyzed by a model that assumes that the emission rate is controlled by gas-phase mass transfer. Results indicate that the para-dichlorobenzene emission from mothcakes is a temperature-sensitive sublimation process. Full-scale house tests were also conducted to measure mass transfer coefficients based on the model developed. The values of the mass transfer coefficient obtained are very comparable to those estimated by theoretical heat transfer studies.

Keywords: *Indoor air pollution, *Air pollution sampling, *Pest control, Mathematical models, Study estimates, Chlorine organic compounds, Test chambers, Houses, Moths, Mass transfer, Temperature dependence, Pollution sources, Ventilation, Air quality, Reprints, *Benzene/dichloro, Mothcakes.

PB93-107043/REB PC **A02**/MF **A01**
Summary of the 1991 EPRI/EPA/DOE SO2 Control Symposium. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
S. M. Dalton, B. Toole-O'Neil, B. K. Gullett, and C. J. Drummond. c1992, 10p EPA/600/J-92/358
Pub. in Jnl. Air and Waste Management Association, v42 n8 p1110-1117 Aug 92. Prepared in cooperation with Electric Power Research Inst., Palo Alto, CA., and Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.

The paper discusses the 1991 SO2 Control Symposium, held December 3-6, 1991, in Washington, DC, and jointly sponsored by the Electric Power Research Institute (EPRI), the U.S. Environmental Protection Agency (EPA), and the U.S. Department of Energy (DOE). It focused attention on recent improvements in conventional sulfur dioxide (SO2) control technologies, emerging processes, and strategies for complying with the Clean Air Act Amendments of 1990. It provided a forum for the exchange of technical and regulatory information on SO2 control technology. More than 800 representatives of 20 countries from government, academia, flue gas desulfurization (FGD) process suppliers, equipment manufacturers, engineering firms, and utilities attended. In all, 50 U.S. utilities and 10 utilities in other countries were represented. In 11 technical sessions, speakers presented 111 technical papers on development, operation, and commercialization of wet and dry FGD, clean coal technologies, and combined sulfur oxide/nitrogen oxide (SOx/NOx) processes.

Keywords: *Meetings, *Air pollution control, *Sulfur dioxide, *Air pollution abatement, Wet methods, Dry methods, Clean Air Act, Standards compliance, Pollution regulations, Coal preparation, NOXSO process, Flue gases, Reprints, Flue gas desulfurization, Foreign technology.

PB93-107050/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 3, Hydraulic Conductivity Variability and Calculated Macrodispersivities. Journal article.
Geological Survey, Marlborough, MA. Water Resources Div.
K. M. Hess, S. H. Wolf, and M. A. Celia. c1992, 22p EPA/600/J-92/359
Pub. in Water Resources Research, v28 n8 p2011-2027 Aug 92. See also PB91-216275. Prepared in cooperation with ENSR Consulting and Engineering, Acton, MA., and Princeton Univ., NJ. Dept. of Civil Engineering. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Hydraulic conductivity (K) variability in a sand and gravel aquifer on Cape Cod, Massachusetts, was measured and subsequently used in stochastic transport theories to estimate macrodispersivities. Nearly 1500 K measurements were obtained by borehole flowmeter tests and permeameter analyses of cores. The geometric mean for the flowmeter tests (0.11 cm/s) is similar to that estimated from other field tests. The mean for the permeameter tests (0.035 cm/s) is significantly lower, possibly because of compaction of the cores. The variance for the flowmeter (0.24) is also greater than that for the permeameter (0.14). Geostatistical analyses applying negative exponential models with and without nuggets reveal similar spatial correlation structures for the two data sets. Estimated correlation scales range from 2.9 to 8 m in the horizontal and from 0.18 to 0.38 m in the vertical. Estimates of asymptotic longitudinal dispersivity (0.35-0.78 m) are similar in magnitude to that observed in the natural gradient tracer test (0.96 m) previously conducted at the site. (Copyright (c) 1992 by the American Geophysical Union.)

Keywords: *Water pollution, *Subsurface investigations, *Environmental transport, *Tracer techniques, Porous media, Ground water, Aquifer characteristics, Dispersion, Hydraulic conductivity, Hydrology, Path of pollutants, Stochastic processes, Study estimates, Reprints, *Cape Cod(Massachusetts), Macrodispersion.

PB93-107068/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Significance and Characteristics of the Personal Activity Cloud on Exposure Assessment Measurements for Indoor Contaminants. Journal article.
North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering.
C. E. Rodes, R. M. Kamens, and R. W. Wiener. c1991, 25p EPA/600/J-92/360
Grant EPA-R-81515
Pub. in Indoor Air, v2 p123-145 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The influence of personal activity sources on exposure to indoor contaminants is defined and demonstrated using data from occupational and residential studies. The ratios of measurements from personal exposure monitors to those made by microenvironmental exposure monitors are summarized to be typically 3 to 10 for occupational settings and 1.2 to 3.3 for residential settings. The ratios are shown to be lognormally distributed, and dependent primarily on the proximity of the source to the receptors. Current models are reviewed for possible application to the prediction of indoor concentration gradients and future model development and validation studies are suggested. (Copyright (c) 1991 Danish Technical Press, DK-Copenhagen.)

Keywords: *Indoor air pollution, *Man environment interactions, *Aerosols, *Air pollution monitors, *Biological dosemeters, Environmental transport, Concentration(Composition), Occupational safety and health, Public health, Exposure, Inhalation, Pollution sources, Dust, Dose-response relationships, Environmental exposure pathway, Mathematical models, Reprints, *Personal activity cloud.

PB93-107076/REB PC **A03**/MF **A01**
CTDMPLUS: A Dispersion Model for Sources Near Complex Topography. Part 1. Technical Formulations. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
S. G. Perry. c1992, 15p EPA/600/J-92/363
Pub. in Jnl. of Applied Meteorology, v31 n7 p633-649 Jul 92. See also PB88-162102, PB88-162110, PB89-181424 and PB91-136564. Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div.

The Complex Terrain Dispersion Model (CTDMPLUS), a point-source, steady-state, model for complex terrain applications, is described. The model is unique in the manner in which it simulates the flow and plume distortion near fully defined three-dimensional terrain. Emphasis is given to windward side impacts. Simplicity is maintained by applying flow distortion corrections to flat-terrain, Gaussian and bi-Gaussian pollutant dstributions. The algorithms for stable and neutral conditions are based on the well established concept of a dividing streamline. These algorithms have been developed with the use of data from three major plume-impaction field studies and a number of fluid modeling studies. The algorithms for plumes released into convective layers are based on recent understanding of the convective boundary layer through fluid modeling, numerical modeling, and field studies. The non-Gaussian nature of vertical dispersion is accounted for; lateral dispersion is modeled with the aid of convective scaling concepts.

Keywords: *Air quality display model, *Air pollution, *Computerized simulation, Environmental transport, Point sources, Atmospheric diffusion, Plumes, Air flow, Wind(Meteorology), Convection, Terrain models, Meteorological data, Reprints, *Complex Terrain Dispersion Model.

PB93-107084/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
CTDMPLUS: A Dispersion Model for Sources Near Complex Topography. Part 2. Performance Characteristics. Journal article.
Computer Sciences Corp., Research Triangle Park, NC.
J. O. Paumier, S. G. Perry, and D. J. Burns. c1992, 17p EPA/600/J-92/363
Contract EPA-68-01-7365
Pub. in Jnl. of Applied Meteorology, v31 n7 p646-663 Jul 92. See also Part 1, PB93-107076. Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The Complex Terrain Dispersion Model (CTDMPLUS), described in Part I of the paper, was evaluated using the SO2 field study data from the Lovett Power plant in southeastern New York State. For additional perspective, CTDMPLUS estimates are also compared with those from the regulatory version of the Rough Terrain Dispersion Model. Comparing the highest 25 hourly observations with the highest 25 model predictions shows a tendency for CTDMPLUS to overpredict, on average, by about a factor of two. Similar results are found for 3-h and 24-h average predictions. Overpredictions occur mainly for stable atmospheric conditions. The meteorological conditions associated with the highest 25 observed concentrations are examined relative to the performance of CTDMPLUS. The analy-

sis suggests that the most significant factors affecting CTDMPLUS predictions for stable conditions are the height of the plume and its relation to the dividing streamline, and in convective conditions the plume penetration, lateral plume spread, and wind direction.

Keywords: *Air quality display model, *Air pollution, *Computerized simulation, Performance evaluation, Atmospheric diffusion, Plumes, Comparison, Wind(Meteorology), Terrain models, Meteorological data, Pollution sources, Sulfur dioxide, Reprints, *Complex Terrain Dispersion Model, Rough Terrain Dispersion Model, Southeast Region(New York).

PB93-107092/REB PC **A02**/MF **A01**
Measurement and Distribution of Radon and Radon Progeny: An Overview of Indoor Radon Risk Reduction in the United States. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
M. Osborne, and J. Harrison. c1992, 10p EPA/600/J-92/364
Pub. in Jnl. of Radioanalytical and Nuclear Chemistry, Articles, v161 n1 p265-272 1992. See also PB88-184906, PB90-160086 and PB90-274119.

The paper presents an overview of indoor radon risk reduction in the U.S. EPA currently estimates that 15,000-20,000 Americans die each year from radon-induced lung cancer. The estimate is based on epidemiological data which establish the link between radon and lung cancer, and surveys which provide estimates of radon exposure to the American public. EPA and state cosponsored radon surveys conducted in 34 states have indicated that houses with elevated radon levels exist in all parts of the U.S. These surveys have also indicated that radon levels in individual houses cannot be predicted with any degree of accuracy with existing methods. Individual houses mmust be tested. Based on these surveys, the EPA estimates that up to 8 million houses have annual average radon levels in the living area which exceed EPA's action guideline of 150 Bq/cu m. Responding to the great health risk posed by indoor radon, EPA, through its comprehensive Radon Action Program, has focused on many activities designed to reduce risk to the public from indoor radon. Key activities in the effort include the research and development of risk-reduction technology and the transfer of the technology to state and local governments, private sector industry, and the public.

Keywords: *Radon, *Indoor air pollution, *Houses, *Air pollution control, *Mitigation, Residential buildings, Risk assessment, Epidemiology, Pulmonary neoplasms, Stationary sources, US EPA, Performance evaluation, United States, Reprints, Radon Action Program.

PB93-107100/REB PC **A03**/MF **A01**
Ninety-Day Toxicity Study of Sodium Monochloroacetate in Sprague-Dawley Rats. Journal article.
Health Effects Research Lab., Cincinnati, OH.
F. B. Daniel, M. Robinson, J. A. Stober, N. P. Page, and G. R. Olson. c1991, 18p EPA/600/J-92/365
Pub. in Toxicology 67, n2 p171-185 Apr 91. See also PB93-107118. Prepared in cooperation with Page Associates, Gaithersburg, MD., and Pathology Associates, Inc., West Chester, OH.

Male and female Sprague--Dawley rats were administered the sodium salt of monochloroacetic acid (SMCA) by oral gavage for a period of 90 consecutive days. Dosage levels of 15, 30, 60 or 120 mg/kg per day were employed. SMCA clearly induced toxicity in both females and males, with the greatest severity in the male animals. Both the liver and kidneys were identified as target organs. At 120 mg/kg per day, 30% of females and 80% of the males died, most within the first 2 days of treatment. Hemorrhagic and congested lungs (possibly a postmortem change) were seen in the early deaths (1--3 days) whereas liver lesions were observed in later deaths. In addition, there was nephrotoxicity as evidenced by elevated creatinine, blood calcium (BCAL), and blood urea nitrogen (BUN) levels. Hepatotoxicity was indicated by increases in the serum levels of alanine aminotransferase (ALT) and aspartate aminotransferase (AST). Both organs showed increased organ-to-body weight ratios. Microscopic examination revealed a significant (P < or = 0.001) increase in chronic renal nephropathy and increased splenic pigmentation at 60 mg/kg per day in the males. Based on the observation of toxicity at all treatment levels in males, a lowest observed adverse effect level (LOAEL) of 15 mg/kg per day is proposed for a 90-day exposure to SMCA by oral gavage to the Sprague--Dawley rat. (Copyright (c) 1991 Elsevier Scientific Publishers Ireland Ltd.)

Keywords: *Toxicity, Rats, Kidney, Blood urea nitrogen, Calcium, Males, Females, Tables(Data), Body weight, Organ weight, Food consumption, Water consumption, Mortality, Reprints, *Acetic acid/monochloroacetic.

PB93-107118/REB PC **A03**/MF **A01**
Ninety-Day Toxicity Study of Chloral Hydrate in the Sprague-Dawley Rat. Journal article.
Health Effects Research Lab., Cincinnati, OH.
F. B. Daniel, M. Robinson, J. A. Stober, N. P. Page, and G. R. Olson. c1992, 18p EPA/600/J-92/366
Pub. in Drug and Chemical Toxicology 15, n3 p217-232 Sep 92. See also PB93-107100. Prepared in cooperation with Page Associates, Gaithersburg, MD., and Pathology Associates, Inc., West Chester, OH.

Male and female Sprague-Dawley rats were administered drinking water containing 300, 600, 1200, or 2400 mg/L chloral hydrate for 90 days. A Control group received distilled water only. No animals died during the study and no differences were observed in body weight gain or food and water consumption, except for males at the highest-dose level. Minor treatment-related effects were observed for organ weights and hematological parameters and these did not appear to be of toxicological significance. Some indications of toxicity were evident in the 2400 mg/L male group (equivalent to 168 mg/kg-day) including a significant decrease in food and water consumption and in weight gain. In addition, histopathological examination of these animals revealed an apparent increase in the incidence of focal hepatocellular necrosis. Increases in AST, ALT and LDH, which occurred at several dose levels in males, but particularly at 2400 mg/L, are consistent with the hepatocellular necrosis of minimal to mild severity diagnosed by microscopic examination. These liver changes, except for sporadic enzyme changes, were not seen in the female rats which actually consumed higher doses of chloral hydrate (e.g. 288 mg/kg-day at 2400 mg/L). (Copyright (c) 1992 by Marcel Dekker, Inc.)

Keywords: *Toxicity, *Chloral hydrate, Lactate dehydrogenase, Food consumption, Water consumption, Body weight, Dose-response relationships, Necrosis, Liver, Alanine aminotransferase, Aspartate aminotransferase, Males, Females, Organ weight.

PB93-107134/REB PC **A03**/MF **A01**
Macromolecular Adduction by Trichloroacetonitrile in the Fischer 344 Rat Following Oral Gavage. Journal article.
Environmental Monitoring Systems Lab., Cincinnati, OH.
E. L. C. Lin, T. V. Reddy, and F. B. Daniel. c1992, 11p EPA/600/J-92/368
Pub. in Cancer Letters 62, n1 p1-9 Feb 92.

Male Fisher 344 rats were administered 1- or 2-((14)C)trichloroacetonitrile (TCAN) by oral gavage. DNA was isolated from the liver, kidneys and stomach and several protein fractions (globin, albumin and globulins) were isolated from blood. The stomach exhibited the highest level of DNA binding, followed in order by the liver and kidney. TCAN binding level was higher in DNA isolated from rats killed at 24 h than at 4 h after administration. Radioactivity associated with DNA was not incorporated into the nitrogen bases (i.e. via de novo synthesis) and a covalent binding index (micromol chemical bound/mol nucleotide phosphate per mmol/kg body wt. of chemical administered) of 30 - 120 was observed for various tissues.

Keywords: *DNA adducts, *Toxicity, Blood proteins, Rats, Deoxyribonucleic acids, Dose-response relationships, Liver, Kidney, Stomach, Liquid chromatography, Reprints, *Nitrile/trichloroaceto.

PB93-107142/REB PC **A03**/MF **A01**
Dermal Penetration of ((14)C)Captan in Young and Adult Rats. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
H. L. Fisher, L. L. Hall, M. R. Sumler, and P. V. Shah. c1992, 23p EPA/600/J-92/369
Pub. in Jnl. of Toxicology and Environmental Health, v36 n3 p251-271 Jul 92. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC., and NSI Technology Services Corp., Research Triangle Park, NC.

Dermal penetration of (14C) Captan was determined in young (33 day old) and adult (82 day old) female Fischer 344 rats by an in vivo method and two in vitro methods. Dermal penetration in vivo at 72 hours was about 9% of the dose in both young and adult rats. No significant difference in dermal penetration (in vivo) between young and adult rats was found. Captan was applied at 0.286 micromoles/sq cm. The percentage penetration was found to increase as dosage decreased. Two in vitro methods gave variable dermal penetration values compared to in vivo results. A static system yielded higher dermal penetration values by about two fold compared to in vivo results for both young and adult rats. A flow system yielded higher dermal penetration values in young rats and lower penetration values in adults compared to in vivo results. A physiological pharmacokinetic model was developed having a dual compartment for the treated skin and appeared to describe dermal absorption and disposition reasonably well. Tissue/blood ratios for organs were found to range from 0.35 to 3.4 indicating no large uptake or binding preferences by any organ.

Keywords: *Skin absorption, *Captan, *Fungicides, Carbon 14, In vivo analysis, Oxygen, Rats, In vitro analysis, Pharmacokinetics, Tissue distribution, Reprints.

PB93-107159/REB PC **A03**/MF **A01**
Thermal Influences on Nervous System Function. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
R. Janssen. c1992, 17p EPA/600/J-92/370
Pub. in Neuroscience and Biobehavioral Reviews, v16 n3 p399-413 Aug 92.

The effects of cooling and warming on neural function are reviewed. The literature is presented progressively from the subcellular through the cellular level to the neural systems level. Temporal measures relevant to membrane activity, action potentials, synaptic transmission and evoked potentials are all consistently increased with cooling and decreased by warming. The various measures of amplitude at difference levels, and even within similar preparations, however, are contradictory: some laboratories report increased amplitudes with cooling and others decreased amplitudes under similar conditions. Emphasis is given to identifying-factors which may resolve the differences. These include: (1) the rate of temperature change, (2) sites of cooling, stimulation and recording, (3) stimulus characteristics, and (4) fundamental differences in temperature sensitivities of different neural tissue. Aside from amplitudes, traditional methods and refined methods of predicting neural response to temperature are good.

Keywords: *Temperature, *Nervous system, Evoked potentials, Hyperthermia, Hypothermia, Membrane potential, Peripheral nerves, Synapses, Metabolism, Blood-brain barrier, Reprints.

PB93-107167/REB PC **A03**/MF **A01**
In vitro Embryotoxicity of a Series of Para-Substituted Phenols: Structure, Activity, and Correlation with In vivo Data. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Perinatal Toxicology Branch.
L. A. Oblesby, M. T. Ebron-McCoy, T. R. Logsdon, F. Copeland, and P. E. Beyer. c1992, 25p EPA/600/J-92/371
Pub. in Teratology 45, n1 p11-33 Jan 92. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC.

The embryotoxicity of phenol and twelve para-substituted congeners on mid-gestation rat embryos was evaluated in vitro. Through application of correlative procedures and stepwise regression, equations describing the relationship between physical-chemical properties and various measures of activity were developed. Embryotoxicity was quantified by the log of the reciprocal of the potency estimates for reduction in selected growth parameters and induction of four morphological defects. In general, co-cultured hepatocytes ameliorated embryotoxicity; only phenol-induced embryotoxicity was enhanced by the presence of hepatocytes. In the absence of hepatocytes, measures of growth retardation were positively correlated with molar refractivity of the phenols. Data from preliminary

dosimetry studies suggest that phenol congeners may accumulate in embryos exposed in vitro more readily than with in vivo exposure. Potency calculations based on dosimetry information may demonstrate better correlations between data and allow additional relationships between chemical structure and activity to be developed.

Keywords: *Teratogenic compounds, *Toxicity, *Structure-activity relationships, *Phenols, Rats, In vivo analysis, In vitro analysis, Liver, Cells(Biology), Embryos, Reprints.

PB93-107175/REB PC **A02**/MF **A01**
Genotoxicity of 2,4,5-Trichlorophenoxyacetic Acid Biodegradation Products in the 'Salmonella' Reversion and Lambda Prophage-Induction Bioassays. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
S. E. George, D. A. Whitehouse, and L. D. Claxton.
c1992, 10p EPA/600/J-92/372
Pub. in Environmental Toxicology and Chemistry, v11 n6 p733-740 Jun 92.

Pseudomonas cepacia strain AC1100 has been isolated and reported to utilize 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) as sole carbon and energy source. Metabolites from the 2,4,5-T degradation pathway were tested for their mutagenicity in the Salmonella reversion bioassay and genotoxicity in the prophage-induction bioassay. The parental compound (2,4,5-T) and three reported metabolites (2,4,5-trichlorophenol, 2,5-dichlorohydroquinone, and 2-chlorosuccinate) were negative with and without metabolic activation in Salmonella typhimurium strains TA98, TA100, TA102, and TA104. Conversely, 2,4,5-T and 2,4,5-trichlorophenol were positive in the prophage-induction bioassay with added S9. 2,4,5-Trichlorophenol was approximately 100-fold more genotoxic than 2,4,5-T 2,5-Dichlorohydroquinone was a weak direct-acting genotoxicant in the assay. In order to determine if strain AC1100 eliminated genotoxicity, 2,4,5-T medium was inoculated and the genotoxicity and the amount of 2,4,5-T remaining were examined over the growth period. As cell numbers increased, the percentage of 2,4,5-T remaining in the medium decreased. The decrease coincided with a decrease in genotoxicity in the prophage-induction bioassay. No mutagenic response was observed in the Salmonella reversion assay.

Keywords: *Mutagens, *Salmonella, Bioassay, Phage lambda, Metabolic activation, Biodeterioration, Pseudomonas cepacia, Tables(Data), Reprints, *Trichlorophenoxyacetic acids.

PB93-107183/REB PC **A02**/MF **A01**
Metabolism and Disposition of Inorganic Arsenic in Laboratory Animals and Humans. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
J. D. McKinney. c1992, 8p EPA/600/J-92/373
Pub. in Environmental Geochemistry and Health, v14 n3 p43-48 Jul 92.

The carcinogenicity of inorganic arsenic in humans, particularly in the lung and skin, has been reasonably well established through epidemiological investigations. Studies of metabolism and disposition of inorganic arsenic in various animal species are particularly relevant to determining the factors that might account for the lack of an animal model. Numerous studies of this type have been reported, but there do not appear to be clear qualitative or quantitative differences in the overall fate and disposition of inorganic arsenic in most animals versus humans, although little is known at the cellular and subcellular level. Sulphur chemistry, especially thiol status, is emerging as an important regulating factor in the overall fate and distribution of inorganic arsenic in the body, playing a role in the initial reduction of arsenate to arsenite and subsequent methylation, and possibly in determining tissue affinity and distribution properties. The metabolism of inorganic arsenic can be viewed as a redox cycle in which thiol compounds such as glutathione (GSH) possibly function as reducing agents and methyl donors as oxidizing agents. One explanation for the possible sensitivity of certain malnourished human populations to the carcinogenic effects of inorganic arsenic may be related to the reduced availability of nonprotein sulphhydryl compounds such as GSH needed to drive the redox cycle and facilitate arsenic detoxification. Future carcinogenicity studies of inorganic arsenic in animals could be designed to address directly the aspect of the problem.

Keywords: *Metabolism, *Arsenic inorganic compounds, *Toxicity, *Carcinogens, Glutathione, Methylation, Thiols, Oxidation, Reduction(Chemistry), Reprints.

PB93-107191/REB PC **A02**/MF **A01**
Age-Related Changes in Disposition and Metabolism of Benzene in Male C57BL/6N Mice. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Toxicology Branch.
T. F. McMahon, and L. S. Birnbaum. c1991, 9p EPA/600/J-92/374
Pub. in Drug Metabolism and Disposition, v19 n6 p1052-1057 Nov 91. Prepared in cooperation with National Inst. of Environmental Health Sciences, Research Triangle Park, NC.

Benzene disposition and metabolism were examined as a function of age in male C57BL/6N mice aged 3 and 18 months. Mice received a single oral dose of either 10 or 200 mg/kg (14)C-benzene (approximately 25 microCi/kg). Excretion of (14)C-derived benzene radioactivity (RA) was monitored in urine, feces, and as exhaled (14)CO2 from 0 to 72 hr, and as exhaled unmetabolized benzene from 0 to 6 hr. At 10 mg/kg (14)C-benzene, urinary elimination was the major route of excretion in both 3- and 18-month mice. Urinary excretion of (14)C-derived benzene RA was significantly decreased in 18- vs. 3-month mice at 4, 6, 24, and 48 hr, while fecal excretion was significantly increased at 72 hr. Elimination of (14)C-benzene as (14)CO2 and unmetabolized (14)C-benzene was also increased in 18- vs. 3-month mice at this dose. The results of these experiments indicate that total metabolism of benzene as well as metabolism to specific metabolites is affected by aging. (Copyright (c) 1991 by The American Society for Pharmacology and Experimental Therapeutics.)

Keywords: *Aging(Biology), *Pharmacokinetics, *Benzene, *Metabolism, Feces, Mice, Carbon dioxide, Carbon 14, Urine, Dose-response relationships, Biotransformation, Reprints.

PB93-107209/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
Comparison of the D1-Dopamine Agonists SKF-38393 and A-68930 in Neonatal 6-Hydroxydopamine-Lesioned Rats: Behavioral Effects and Induction of c-fos-Like Immunoreactivity. Journal article.
North Carolina Univ. at Chapel Hill. School of Medicine.
K. B. Johnson, H. E. Criwell, K. F. Jensen, P. E. Simson, and R. A. Mueller. c1992, 13p EPA/600/J-92/375
Pub. in Jnl. of Pharmacology and Experimental Therapeutics, v262 n2 p855-865 Aug 92. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.

Administration of the selective D1-dopamine receptor agonist 2,3,4,5-tetrahydro-7,8-dihydroxy-1-phenyl-1H-3-benzazepine (SKF-38393) to neonatal 6-hydroxydopamine-lesioned rats results in profound behavioral manifestations and induction of striatal c-fos-like immunoreactivity. The full D1-dopamine agonist l,(R,S)1-aminomethyl-3,4-dihydro-5,6-dihydroxy-3-phenyl-1H-2-benzopyran hydrochloride (A-68930), like SKF-38393, produced a dose-dependent, D1-selective increase in locomotor activity and striatal c-fos-like immunoreactivity. These results with A-68930 provide additional evidence that the specific behavioral and biochemical responses observed in neonatally lesioned rats after SKF-38393 administration are due to actions on D1-dopamine receptors, and indicate that A-68930 provides a new tool for investigating D1-dopamine receptor function.

Keywords: *Dopamine receptors, *Proto-oncogene proteins c-fos, *Pharmacology, *Oxidopamine, Comparison, Locomotion, Rats, Corpus striatum, Immunohistochemistry, Animal behavior, Reprints, *SKF-38393, *A-68930.

PB93-107217/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Mechanisms Underlying Somatosensory Cortical Dynamics: 1. In vivo Studies.
North Carolina Univ. at Chapel Hill. Dept. of Psychology.
C. J. Lee, and B. L. Whitsel. c1992, 28p EPA/600/J-92/377
Grant R-818321010
Pub. in Cerebral Cortex Jnl., v2 n2 p81-106 Mar/Apr 92. See also PB93-107225. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

SI neurons undergo substantial and rapid response modifications (either increases or decreases) during repetitive tactile stimulation. Recovery occurs in a few minutes following cessation of stimulation. The modifications are reproducible (1) if stimulus parameters are not changed and (2) if time for recovery is provided between exposures to repetitive stimuli. Stimuli identical to those which modify SI neuron response rarely lead to changes in the response of mechanoreceptive afferents. The effects of repetitive brushing stimuli on distribution of sensitivity within the RFs of SI neurons are complex and differ from one neuron to the next, but there is a common ingredient: the response generated by stimulus contact with one (or more rarely, several) RF sector(s) becomes enhanced. The changes in the distribution of sensitivity within the RF exhibited by different SI neurons sampled in the same radial penetration are consistent, whereas in tangential penetrations different neurons exhibit diverse, apparently unrelated changes. Simultaneous multichannel recordings reveal that a repetitive stimulus exerts similar effects on the response and RFs of local (separated by no more than 100 micrometers) neuron groupings.

Keywords: *Somatosensory cortex, *Neurons, In vivo analysis, Neuroregulators, Afferent neurons, Macaca mulatta, Macaca fascicularis, Action potentials, Mechanoreceptors, Reprints.

PB93-107225/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Mechanisms Underlying Somatosensory Cortical Dynamics: 2. In vitro Studies. Journal article.
North Carolina Univ. at Chapel Hill. Dept. of Psychology.
C. J. Lee, B. L. Whitsel, and M. Tommerdahl. c1992, 29p EPA/600/J-92/376
Grant EPA-R-818321010
Pub. in Cerebral Cortex Jnl. v2 n2 p107-133 Mar/Apr 92. See also PB93-107217.Color illustrations reproduced in black and white. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

The response of the sensorimotor cortical slice to repetitive, single site afferent drive is mapped using both evoked potential and metabolic mapping (2DG) methods. Systematic changes (increases or decreases) in the evoked potential occur during repetitive 3-5 Hz stimulation. Place, timing, and intensity of repetitive stimulation influence the amplitude and form of the response alterations observed at a given cortical locus. The neuron populations which exhibit different response modifications to the same repetitive stimulus are distributed non-randomly in the slice: neurons occupying column-shaped aggregates undergo a common response alteration (either an increase or decrease) during repetitive stimulation, with sharp boundaries separating neighboring aggregates distinguishable on the basis of their dynamic behaviors. The distribution of stimulus-evoked 2DG uptake in the slice is columnar, the dimensions of the 2DG columns corresponding to those mapped with neurophysiological methods. Taken together, the findings support the concept (Whitsel et al., 1991) that repetitive stimulation causes the intrinsic network of somatosensory cortex to dynamically modify the network's response to extrinsic excitatory drive so that the local differences in the pattern of extrinsic excitatory drive to neighboring cortical columns are enhanced.

Keywords: *Somatosensory cortex, *Neurons, Neurophysiology, In vitro analysis, Evoked potentials, Electric stimulation, Rats, Deoxyglucose, Metabolism, Reprints.

PB93-107233/REB PC **A03**/MF **A01**
Animal Models for Assessing the Neurobehavioral Impact of Airborne Pollutants. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.

R. C. MacPhail, and D. B. Peele. c1992, 12p EPA/600/J-92/378
Pub. in Annals of the New York Academy of Sciences, v641 p294-303 Apr 92. Prepared in cooperation with Northrop Services, Inc., Research Triangle Park, NC.

There has been a long-standing tradition of experimentation on laboratory animals and the behavioral effects of airborne pollutants. These studies provide a scientific basis for investigating many of the pressing issues on indoor-air pollution. Several different procedures are reviewed, along with representative data taken from the literature. Models are already available for quantitatively assessing the noxious properties of airborne chemicals. A number of physiological responses pertinent to the sick building syndrome have been shown to be produced by conditioning in laboratory animals. The possibility is suggested that similar conditioning may take place in affected humans.

Keywords: *Animal disease models, *Air pollution effects(Animals), *Animal behavior, *Indoor air pollution, Physiology, Ozone, Carbon monoxide, Acetic acid, Ammonia, Avoidance learning, Taste, Xylenes, Reprints.

PB93-107241/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Using Isotherms to Predict GAC's Capacity for Synthetic Organics. Journal article.
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
S. Qi, V. L. Snoeylink, E. A. Beck, W. E. Koffskey, and B. W. Lykins. c1992, 10p EPA/600/J-92/379
Grant EPA-R-814043
Pub. in Jnl. of the American Water Works Association, p113-120 Sep 92. Prepared in cooperation with Jefferson Parish Dept. of Public Works, LA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

This investigation involved operating a pilot granular activated carbon (GAC) plant to obtain capacity data under typical field conditions, determining isotherms for selected synthetic organic chemicals, and comparing the capacity predicted by the isotherm data with the pilot-plant capacity data. The pilot-plant GAC capacities at saturation for empty bed contact times of 2.5 to 5.0 min were within a factor of 2.5 of the isotherm capacities. This is reasonably good agreement, considering that the displacement effects that take place in the GAC columns are not accounted for in the isotherm calculations.

Keywords: *Activated carbon, *Pilot plants, *Isotherms, *Organic compounds, *Water treatment, Chemical analysis, Field tests, Graphs(Charts), Tables(Data), Reprints.

PB93-107258/REB PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Effects of E-SOx Technology on ESP Performance. Final rept. Aug-Nov 90.
Southern Research Inst., Birmingham, AL.
G. H. Marchant, J. P. Gooch, and M. G. Faulkner. Oct 92, 72p SRI-ENV-91-89-6790, EPA/600/R-92/196
Grant EPA-R-814915
See also PB90-216441 and PB90-262916. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report gives results of an evaluation of the E-SOx process at Ohio Edison's Burger Station. Adequate sulfur dioxide (SO2) removal and acceptable particulate emission levels from the electrostatic precipitator (ESP) were the prime objectives of the investigation. The report describes limited ESP performance testing under both baseline and E-SOx conditions. The ESP data collected under E-SOx conditions, which give the required 50% SO2 removal, show evidence of ESP performance dominated by factors not represented in existing versions of ESP performance models. These analyses and other considerations indicate that the factors which dominate under the conditions tested are a combination of instantaneous reentrainment of low resistivity ash/sorbent particles and deagglomeration of slurry residues within the ESP. These observations may be important to other sorbent injection processes as well as to E-SOx. Improvement of the gas velocity and temperature distributions at the ESP inlet improved the ESP performance, but performance was still dominated by the reentrainment process and was therefore lower than mathematical model predictions.

Keywords: *Air pollution control, *Sulfur oxides, *Electrostatic precipitators, *Air pollution control equipment, *Sorbent injection processes, Pilot plants, Sulfur dioxide, Performance evaluation, Technology utilization, Particulates, Design criteria, Quality control, Gas flow, Spraying, *E-SOx process.

PB93-107266/REB PC **A06**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Opportunities for Pollution Prevention Research to Support the 33/50 Program.
Battelle, Columbus, OH.
Oct 92, 113p EPA/600/R-92/175
Contract EPA/68-CO-0003
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The document compiles information on existing pollution prevention methods and identifies research needs. It helps define areas for research to increase application of existing methods and create new approaches for source reduction and recovery/recycling of 17 chemical groups targeted in the 33/50 Program. The emphasis is on source reduction, but recovery/recycling methods are also considered. A functional approach is used to identify and organize research areas for each of the 17 targeted chemical groups. The sources and production characteristics and rates are briefly summarized. Then pollution prevention opportunities and supporting research needs are discussed for the major industrial and consumer applications of the targeted chemical groups. The opportunities and research needs are presented in both narrative and tabular formats.

Keywords: *Pollution abatement, *Research, *Waste management, Industrial wastes, Consumer products, Household wastes, Garbage, Chemical compounds, Metals, Organic compounds, Mercury, Environmental protection, Cadmium, Chromium, Nickel, Cyanides, Lead(Metal), *Source reduction, *Waste minimization, Pollution Prevention Act of 1990.

PB93-107282/REB PC **A02**/MF **A01**
EPA Pesticide RED FACTS Sheets: Indole-3-Butyric Acid.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Aug 92, 6p EPA/540/FS-92/216

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not post unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet on indole-3-butyric acid summarizes EPA's conclusion, as set forth in the Reregistration Eligibility Document (or RED), that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, Hazardous materials, Chemical properties, Regulations, Growth regulators, Toxicology, Ecology, Plant growth, Agricultural products, *Chemical information fact sheet, *Indole butyric acid, Use patterns, Science findings.

PB93-108322/REB PC **A05**/MF **A01**
PA-Score (Preliminary Assessment Score) User's Manual and Tutorial. Version 2.1.
Environmental Protection Agency, Washington, DC. Hazardous Site Evaluation Div.
16 Nov 92, 82p
For system on diskette, see PB93-500346 and PB93-500353.

The PA-Score software package is comprised of the PA-Score and PA-Print computer programs and the users manual. The PA-Score software package has been developed to assist preliminary assessment (PA) evaluations by generating an upper bound estimate of the Hazard Ranking System (HRS) score and associated documentation for a site. The PA-Score computer program (PA-Score) assists investigators in meeting PA evaluation requirements. PA-Score performs PA calculations from raw data to calculate site scores. The PA-Print computer program (PA-Print) generates PA scoresheets and the Potential Hazardous Waste Site Preliminary Assessment form. The users manual provides instructions to install and use PA-Score and PA-Print.

Keywords: *User manuals(Computer programs), *Superfund, *Waste management, *Hazardous materials, *Environmental surveys, Forms(Paper), Ranking, Site characterization, US EPA, Procedures, Information transfer, *Preliminary Assessment, National Priorities List, Hazard Ranking System, PA-Score computer program, PA-Print computer program.

PB93-110187/REB PC **A17**/MF **A03**
Environmental Protection Agency, Washington, DC.
Biologic Markers of Air-Pollution Stress and Damage in Forests. Final rept.
National Research Council, Washington, DC. Board on Environmental Studies and Toxicology.
1989, 378p ISBN-0-309-04078-7
Library of Congress catalog card no. 89-62584. Sponsored by Environmental Protection Agency, Washington, DC.

Forests are subject to stress from natural causes and human activities. Biologic markers (i.e., indicators) associated with specific air pollutant stress and damage in forests have been sought to improve discrimination among the many anthropogenic and natural causes of stress. The U.S. Environmental Protection Agency asked the National Research Council to arrange a workshop to bring together researchers in forest science and complementary disciplines to summarize the current state of knowledge and research on biologic markers and identify and evaluate promising techniques that might lead to the development of new markers. The group reviewed the current and potential uses of biological markers at a variety of organizational levels, from the subcellular to the ecosystem level. The report is in two parts: the committee's report; and the 32 papers produced by individual participants who attended the workshop. The committee's report provides a summary of the workshop, a review of criteria for the establishment of cause and effect in complex relationships a discussion of the use of biologic markers to identify stress and damage in trees and forests, and the committee's conclusions and recommendations for further development and application of biologic markers.

Keywords: *Biological markers, *Air pollution effects(Plants), *Forests, *Meetings, *Trees(Plants), Biological indicators, Biological stress, Natural emissions, Plants(Botany), Review, Dose-response relationships, Ecosystems, Plant anatomy, Biochemistry, Regional analysis, Exposure, Foreign technology.

PB93-111029/REB PC **A09**/MF **A03**
Public Access: A How To Guide.
Environmental Protection Agency, Washington, DC. Information Management and Services Div.
Jul 91, 197p EPA/220/B-92/021

Over the last several years, EPA has been experiencing an increase in demand from the public for information maintained by the Agency. In order to meet the demand, EPA's offices have been responding in a variety of ways, including using information centers, clearinghouses, dockets, hotlines, and databases to make the information available. The Office of Information Resources Management (OIRM), in its role as National Program Manager for Public Access, has been promoting coordination and enhancement of these public access activities to increase efficiency in providing information. The Public Access guide is another one of the steps that OIRM is taking to promote the increased efficiency.

Keywords: *Environmental surveys, *Information services, *Demand(Economics), *US EPA, Information sources, Management, Facilities, Data bases, Efficiency, Clients, Distribution(Property), International trade, Universities, State government, *Public access guide.

PB93-111052/REB PC **A10**/MF **A03**
Department of Defense, Washington, DC.
Technology Needs and Emerging Technologies (Joint Environmental Restoration and Waste Management Activities).
Western Governors' Association, Denver, CO.

Oct 92, 206p
Sponsored by Department of Defense, Washington, DC., Department of the Interior, Washington, DC., Department of Energy, Washington, DC., and Environmental Protection Agency, Washington, DC.

The report was prepared by an interagency Federal Working Group. It references detailed information produced by the agencies as of June 1992 on needs and technologies in environmental restoration and, to a lesser extent, in waste management and provides a very general overview of that material. It does not represent new or independent analysis of technology needs or of emerging technologies. The purpose of the MOU is 'to establish a more cooperative approach to development of technical solutions to the environmental restoration and waste management problems shared by States, commercial entities, and the Federal government.' All Federalsignatories are committed to cooperatively developing solutions to the Nation's cleanup problems. The cooperation must be both between and among the Federal signatories, and between the Federal signatories and the WGA. To provide more cogent analysis in future reports, common terminology for classifying technology needs and initiatives must first be devised by the agencies.

Keywords: *Environmental surveys, *Waste management, Technology transfer, Cooperation, Classifying, International trade, Markets, Decision making, Cost reduction, Safety, Technology assessment, National government, Licenses, Cleanup.

PB93-111185/REB PC A05/MF A01
Test Car List, 1992. Passenger Cars.
Environmental Protection Agency, Washington, DC.
5 Sep 91, 90p

For each model year, each manufacturer must calculate the fuel economy for similar vehicles. This report is a listing of the individual data that are used to determine the average fuel economy data. This report contains key test parameters, actual emission levels, and actual fuel economy for each of the specific test vehicles required for the 1992 model year. The subsequent average data can be found in the NTIS report number PB93-111193 or PB93-111201. These data were submitted to the Environmental Protection Agency's Certification Division at the National Vehicle and Fuel Emissions Laboratory.

Keywords: *Motor vehicles, *Fuel economy, *Federal test procedure, *Air pollution sampling, *Exhaust emissions, Automobiles, Certification, Requirements, Listings, Automotive industry, Concentration(Composition), Tables(Data).

PB93-111193/REB PC A04/MF A01
Fuel Economy Guide, 1992. 3-Number.
Environmental Protection Agency, Washington, DC.
13 Feb 92, 72p

For each model year, the Energy Policy and Conservation Act requires that a compilation of fuel economy values be provided to the public. These data are intended to help the consumer compare the fuel economy of similar size cars, light-duty trucks, and special purpose vehicles. The adjusted fuel economy values are provided for city, highway, and a combination of city and highway driving. In addition, the interior volume and estimated annual fuel costs are provided. The individual data generated for each of the model types can be found in the NTIS report number PB93-111185. These data were submitted to the Environmental Protection Agency's Certification Division at the National Vehicle and Fuel Emissions Laboratory.

Keywords: *Fuel economy, *Guidelines, *Motor vehicles, Tables(Data), Public information, Cost analysis, Study estimates, Energy conservation, Energy Policy and Conservation Act.

PB93-111201/REB PC A04/MF A01
Fuel Economy Guide, 1992. 6-Number.
Environmental Protection Agency, Washington, DC.
Feb 92, 72p

For each model year, the Energy Policy and Conservation Act requires that a compilation of fuel economy values be provided to the public. These data are intended to help the consumer compare the fuel economy of similar size cars, light-duty trucks, and special purpose vehicles. The adjusted and unadjusted fuel economy values are provided for city, highway, and a combination of city and highway driving. The unadjusted, or as tested, fuel economy values are as calculated during the testing of a vehicle on a chassis dynamometer. The adjusted fuel economy values have been adjusted to reflect conditions which would normally be encountered during actual driving. These values are always lower than the values calculated during the actual testing in laboratory controlled conditions. In addition, the interior volume and estimated annual fuel costs are provided. The individual data generated for each of the model types can be found in the NTIS report number PB93-111185.

Keywords: *Fuel economy, *Guidelines, *Motor vehicles, Tables(Data), Public information, Cost analysis, Study estimates, Energy conservation, Energy Policy and Conservation Act.

PB93-111219/REB PC A13/MF A03
Federal Certification Test Results for 1992 Model Year. Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines.
Environmental Protection Agency, Washington, DC.
1992, 285p

Each manufacturer of a passenger car, (light-duty-vehicle), light-duty truck, motorcycle, heavy-duty gasoline engine, and heavy-duty diesel engine is required to demonstrate compliance with the applicable exhaust emission standard. This report contains all of the individual tests that were required by the certification-procedures found in Title 40 of the Code of Federal Regulations in Part 86. These data were submitted to the Environmental Protection Agency's Certification Division at the National Vehicle and Fuel Emissions Laboratory.

Keywords: *Federal test procedure, *Air pollution standards, *Air pollution sampling, *Motor vehicles, *Exhaust emissions, Pollution regulations, Certification, Automotive industry, Requirements, Air pollution abatement, Tables(Data), Concentration(Composition).

PB93-111706/REB PC A03/MF A01
Oil and Hazardous Materials Technical Assistance Data System, (OHM-TADS) Fields and Their Definitions. Users' Guide.
Environmental Protection Agency, Arlington, VA.
1992, 16p EPA/DF/DK-93/010A
For system on diskette, see PB93-500577.

The user's guide consists of table 1, OHM-TADS Fields and Their Definitions. Field number, field mnemonic, field title, and the definition is presented. The information in the table includes name, chemical properties, physical properties, biological effects, toxicity, and emergency planning data.

Keywords: *Oil spills, *Hazardous materials spills, *User manuals, Tables(Data), Data storage, Chemical properties, Physical properties, Biological effects, Toxicology, Emergency planning, Land pollution control, Water pollution control, Documentation.

PB93-112290/REB PC A06/MF A02
Environmental Protection Agency, Washington, DC.
Drinking Water and Health: Disinfectants and Disinfectant By-Products. Volume 7. Final rept.
National Research Council, Washington, DC.
1987, 117p ISBN-0-309-03741-7
Contract EPA-68-01-3169
See also PB92-223130. Library of Congress catalog card no. 77-89284. Sponsored by Environmental Protection Agency, Washington, DC.

The report examines the innovations in disinfection and disinfectant by-products that has led to changes in procedures for disinfecting drinking water in the 6 years since the committee reviewed the potential health effects of these practices in Volumes 2 and 3. The predominant method of drinking water disinfection practiced in the US today is chlorination. The committee developed risk assessment and recommended SNARLs for chloroform and other nonvolatile by products of chlorination based on available data. Risk assessments for disinfectants or their by-products were calculated when sufficient data were available.

Keywords: *Potable water, *Water treatment, *Disinfectants, Risk assessment, Chlorine organic compounds, Chlorination, Dose-response relationships, Health hazards, Chemical reactions, Aquatic microbiology.

PB93-112357/REB PC A03/MF A01
Environmental Protection Agency, Washington, DC.
Susceptibility and Status of Gulf of Mexico Estuaries to Nutrient Discharges. Strategic Assessment of Near Coastal Waters. Summary rept.
Delaware Univ., Newark. Coll. of Marine Studies.
H. Quinn, J. P. Tolson, C. J. Klein, S. P. Orlando, and C. Alexander. Jun 89, 42p
Prepared in cooperation with National Oceanic and Atmospheric Administration, Rockville, MD. Ocean Assessments Div. Sponsored by Environmental Protection Agency, Washington, DC.

The report summarizes the estimated relative susceptibility and estimated status of 23 estuaries in the Gulf of Mexico with respect to nutrient-related pollution. It is the second of a series of reports being developed to assist the U.S. EPA implement its Near Coastal Waters Program and National Estuary Program. The report is intended to increase understanding of coastal environmental problems and to serve as a tool for coastal resource decision-making.

Keywords: *Nutrients, *Estuaries, *Water pollution, *Mexico Gulf, Coasts, Environmental impacts, Decision making, Concentration(Composition), Susceptibility.

PB93-112506/REB PC A03/MF A01
Living Resources Subcommittee: Annual Summary.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Jul 92, 18p

In 1991, the Living Resources Subcommittee made substantial progress in placing building blocks into the framework established by the 1987 Chesapeake Bay Agreement. The standard work, such as the creation of fishery management plans, is proceeding on schedule. The subcommittee will continually reassess the restoration strategies to supplement them with new information and to analyze their effectiveness, given that uncontrollable factors such as climate and disease also play a role. Oysters and crabs are first on the table, and will receive serious attention in the next two years.

Keywords: *Chesapeake Bay, *Natural resources management, *Conservation, Wetlands, Goals, Wildlife, Habitats, Project planning, Interagency coordination, *Living Resources Subcommittee.

PB93-112704/REB PC A03/MF A01
Waterfowl Workgroup Living Resources Subcommittee: Annual Progress Report.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
1991, 12p CBP/APR-92/102

The report outlines the major accomplishments of the Waterfowl Workgroup in 1991. The workgroup consists of biologists from both state and Federal agencies representing the various interests in waterfowl management in the Chesapeake Bay Region.

Keywords: *Management planning, *Aquatic animals, *Chesapeake Bay, *Marine biology, State government, National government, Clams, Mapping, Dredging, Ducks, Education, Surveys, *Waterfowl.

PB93-113538/REB PC A07/MF A02
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
Volunteer Lake Monitoring Program, 1991. Volume 3. Northeastern Illinois Region. Annual rept.
Northeastern Illinois Planning Commission, Chicago.
H. L. Hudson. Jun 92, 145p IEPA/WPC-92-110C
See also report for 1990, PB91-210765. Sponsored by Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.

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 volun-

teers 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. VLMP participants are trained to measure water transparency with a Secchi disc: an eight-inch round metal plate painted black and white in alternating quadrants, attached to a calibrated rope. The disc is lowered into the water and the depth at which it disappears is recorded. The measurement, called the Secchi disc depth, is used to document changes in the transparency of the lake water. Typically, three sites are monitored in each lake twice per month from May through October.

Keywords: *Water quality data, *Water pollution sampling, *Lakes, Sampling, Ranking, Environmental Protection Agency, State programs, Regional analysis, Transparence, Field tests, Depth, Graphs(Charts), Tables(Data), Sites, *Northeast Region(Illinois), Volunteers, Secchi Disk.

PB93-114585/REB PC **A03**/MF **A01**
Chesapeake Bay Striped Bass Fishery Management Plan: Chesapeake Bay Program. Annual Progress Report (April 1992).
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Apr 92, 24p CBP/APR-92/100
See also PB92-186428.

Under the 1987 Chesapeake Bay Agreement, the Bay jurisdictions committed to developing a series of fishery management plans (FMPs) for commercially, recreationally, and selected ecologically valuable species. Striped bass was selected as an important species and a management plan was completed in 1989. The workgroup is composed of representatives from government agencies, the academic community, the fishing industry, and public interest groups representing the District of Columbia, Maryland, Pennsylvania, and Virginia. The Striped Bass FMP contains biological information, a discussion of problem areas, and recommended management actions.

Keywords: *Fisheries, *Bass, *Chesapeake Bay, Management planning, Ecology, Agreements, Government agencies, Losses, Regulations, Stripped bass, Fishing industry.

PB93-114961/REB PC **E09**/MF **A01**
National Study of Chemical Residues in Fish. Volume 1.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Sep 92, 41p EPA/823/R-92/008A
Errata sheet inserted. See also Volume 2, PB93-114999. Prepared in cooperation with Wisconsin Univ.-Superior. Center for Lake Superior Environmental Studies.

The study, previously referred to as the National Bioaccumulation Study, is a one-time screening investigation to determine the prevalence of selected bioaccumulative pollutants in fish and to identify correlations with sources of these pollutants. In addition, estimates were made of human health risks for those pollutants studied for which cancer potency factors and/or reference doses have been established. Human health risks were not estimated for dioxins and furans since the potency of these pollutants is the subject of an EPA review. Appendix C and Appendix D are contained in Volume II of the study.

Keywords: *Fishes, *Water pollution effects(Animals), *Xenobiotics, Carcinogens, Health hazards, Tables(Data), Graphs(Charts), Field tests, Chemical analysis, Spatial distribution, Species diversity, Humans, *Chemical residues, *National Bioaccumulation Study.

PB93-114999/REB PC **E11**/MF **A04**
National Study of Chemical Residues in Fish. Volume 2.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Sep 92, 436p EPA/823/R-92/008B
See also Volume 1, PB93-114961. Prepared in cooperation with Wisconsin Univ.-Superior. Center for Lake Superior Environmental Studies.

The report is v. II of a two-volume set; the volume contains Appendices C and D of the National Study of Chemical Residues in Fish.

Keywords: *Chemical properties, *Fishes, *Water pollution, Bioaccumulation, Carcinogens, Chlorine organic compounds, Oxygen heterocyclic compounds, Herbicides, Sources, Exposure, Laboratory animals, Neoplasms, Wood preservatives, Humans, Tests, Toxicology, Chlorodane, Diets, Tables(Data), *Pesticide residues, Dioxin/tetrachloro-dibenzo.

PB93-115160/REB PC **A09**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Technology Evaluation Report of Retech's Plasma Centrifugal Furnace. Volume 1.
Science Applications International Corp., San Diego, CA.
Apr 92, 190p EPA/540/5-91/007A
Contract EPA-68-CO-0048
See also Volume 2, PB93-115178. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A demonstration of the Retech, Inc. Plasma Centrifugal Furnace (PCF) was conducted under the Superfund Innovative Technology Evaluation (SITE) Program at the Department of Energy's (DOE's) Component Development and Integration Facility in Butte, Montana. The furnace uses heat generated from a plasma arc to melt and vitrify solid feed material. The feed soil was a mixture of Silver Bow Creek soil and 10 percent by weight No. 2 diesel oil, spiked to provide 28,000 ppm zinc oxide and 1000 ppm hexachlorobenzene in the soil/oil mixture. Pre-treatment soil and scrubber liquor/makeup sampling was performed to characterize the material inputs to the process. Following treatment, the vitrified soil, scrubber liquor, and stack gas were sampled to determine the technology's suitability for use in destroying and immobilizing contaminants in the test soil. The results from the test were used to draw conclusions on the technology.

Keywords: *Heat treatment, *Waste treatment, *Soil treatment, *Superfund, Land pollution control, Vitrification, High temperature tests, Air pollution control, Immobilization, Incineration, Furnaces, Metals, Organic compounds, Performance evaluation, Design criteria, Sampling, Leaching, Quality assurance, Quality control, *Innovative treatment technologies, *Plasma centrifugal furnaces, Butte(Montana), Retech Incorporated.

PB93-115178/REB PC **A15**/MF **A03**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Technology Evaluation Report of Retech's Plasma Centrifugal Furnace. Volume 2.
Science Applications International Corp., San Diego, CA.
Apr 92, 348p EPA/540/5-91/007B
Contract EPA-68-CO-0048
See also Volume 1, PB93-115160. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The volume contains the appendices for volume 1. The report contains TCLP data; particulates data; stack gas data; feed soil data; treated soil data; pretest scrubber liquor data; posttest scrubber liquor data; scrubber make-up data; continuous emission monitors data; physical results data; gas sampling logs; audit reports; and equipment operations data.

Keywords: *Heat treatment, *Waste treatment, *Soil treatment, *Superfund, Air pollution control, Tables(Data), Leaching, Metals, Organic compounds, Vitrification, Field tests, *Innovative treatment technologies, *Plasma centrifugal furnaces, Butte(Montana), Retech Incorporated, Toxicity Characteristic Leaching Procedure.

PB93-115186/REB PC **A11**/MF **A03**
Sediment Classification Methods Compendium.
Environmental Protection Agency, Washington, DC. Sediment Oversight Technical Committee.
Sep 92, 229p EPA/823/R-92/006
Contract EPA-68-C8-0062

The document is a compendium of scientifically valid and accepted methods that can be used to assess sediment quality and predict ecological impacts. Guidance on how to use the compendium methods in a decision-making framework will be provided in forthcoming documents. The information provided in this compendium on the relative strengths and weaknesses of the different assessment methods can provide assistance in selecting the appropriate methods.

Keywords: *Sediments, *Water pollution effects, *Environmental effects, *Aquatic ecosystems, *Tests, Pollution regulations, Classification, Assessments, Marine biology, Sampling, Analytic techniques, Trends, Quality assurance, Quality control, Toxicity, Freshwater, Ocean waste disposal.

PB93-115806/REB PC **A05**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Application and Calibration of Pressure Instruments, Flowmeters, and Flow Control Devices.
SMC Martin, Inc., Valley Forge, PA.
A. J. Vellios, and J. Mentz. Feb 85, 96p EPA/570/9-87/003
Contract EPA-68-01-6288
Sponsored by Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.

The Underground Injection Control (UIC) program was established by the U.S. Environmental Protection Agency to protect underground sources of drinking water (USDW's) from potential pollution by injection wells. Contamination can be the result of unregulated or poorly built wells. However, even properly constructed wells can eventually corrode or malfunction, with resultant discharge of injection fluids into unauthorized zones and/or USDWs. The UIC program is responsible for testing the mechanical integrity of all injection wells upon emplacement and once every five years after (for most states). An important part of the underground injection control effort involves monitoring injection volumes and pressures. This requires accurate and reliable equipment, along with knowledge on how to use the equipment. Instruments that measure volume include all kinds of flowmeters and their totalizers, indicators, and recorders. The report discusses the various devices that are used to measure the pressures and the flow rates of injection wells.

Keywords: *Injection wells, *Flowmeters, *Pressure measuring instruments, *Calibration, *Water pollution, *Potable water, Transducers, Valves, Actuators, Pressure measurement, Flow measurement, Bottom hole pressure.

PB93-115814/REB PC **A03**/MF **A01**
Citizen's Guide to Ground-Water Protection.
Environmental Protection Agency, Washington, DC. Office of Ground-Water Protection.
J. Gallagh. Apr 90, 40p EPA/440/6-90/004
Color illustrations reproduced in black and white.

The guide is intended to help the reader take an active and positive role in protecting one's community's ground-water supplies. It outlines the natural cycle that supplies the earth with ground water, briefly explains how ground water can become contaminated, examines ways to protect ground-water supplies, and describes roles the reader and community can play in protecting ground-water supplies.

Keywords: *Water pollution abatement, *Ground water, *Guidelines, *Citizen participation, *Water quality, Water supply, Environmental protection, Pollution regulations, Household wastes, Information sources, Underground storage, Water storage, Waste disposal, Storage tanks, Land use, Community relations, Sewers.

PB93-115830/REB PC **A05**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Economic Assessment of Reducing Fluoride in Drinking Water.
Abt Associates, Inc., Cambridge, MA.
Nov 85, 78p EPA/570/9-86/001
Sponsored by Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.

The report assesses the economic impacts of reducing fluoride in drinking water. The principal elements of the report are: definition of the fluoride contamination problem, review of regulatory alternatives, assessment of the benefits of fluoride removal, assessment of the costs of removing fluoride, analysis of regulatory flexi-

bility and paperwork requirements, and exploration of uncertainty in the estimates of costs and benefits.

Keywords: *Fluorination, *Water treatment, *Potable water, *Economic impact, *Water pollution control, *Fluorides, Benefit cost analysis, Reviews, Regulations, Assessments, Dentistry, Maximum contaminant level.

PB93-115855/REB PC A04/MF A01
Florida Small Systems Compliance Project. Final rept.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Apr 91, 61p EPA/570/9-91/006

The object of the project was to demonstrate the effectiveness of a coordinated effort of enforcement, training, technical assistance and outreach to improve compliance of small water systems. The project was conducted in Hillsborough County and Polk County in Florida. The effectiveness of the coordinated effort was measured by the number of violations resolved over a one year period, October 1989 to September 1990, and the costs of achieving those results were tracked by each organization participating in the project.

Keywords: *Water pollution abatement, *Water treatment, *Surveys, *Water quality, *Potable water, Compliance, Florida, Law enforcement, Training, Technical assistance, Cost analysis, Legal aspects, Violations, Information dissemination, *Small systems, Hillsborough County(Florida), Polk County(Florida).

PB93-115863/REB PC A12/MF A03
Managing Ground Water Contamination Sources in Wellhead Protection Areas: A Priority Setting Approach.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Oct 91, 259p EPA/570/9-91/023

The document is one of a series of technical assistance documents designed by the U.S. EPA to help local governments and public water suppliers protect their wells and implement their state and local Wellhead Protection Programs. The priority setting approach provides a risk screening tool that helps users to assess and rank the relative threats to ground-water supplies posed by specific potential contamination sources.

Keywords: *Ground water, *Water wells, *Contamination, *Protection, Water management, Technical assistance, Fluid infiltration, Water supply, Risk, Screening, Sources, State government, Local government.

PB93-115871/REB PC A05/MF A01
Sanitary Survey Training: Instructor's Guide for Inspectors of Small Water Systems.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Sep 89, 78p EPA/570/9-88/003
See also PB93-115889.

The Instructor's Guide and Reference Manual are intended for use in conducting technical assistance seminars for state and local agency personnel responsible for state public water supply programs under the Federal Safe Drinking Water Act. The overall objective of training conducted using these materials is to provide the minimum training that, when complemented by on-the-job training, will enable personnel to perform effective evaluations of small public water supply systems for potential health and safety violations. Personnel attending training where these manuals are used by an instructor should have a basic knowledge of water supply systems and some limited on-the-job experience of conducting a sanitary survey under the immediate direct supervision of an experienced agency inspector. These manuals do not provide technical detail on every facet of a water system, nor are they intended to provide an inspector with the ability to provide technical assistance.

Keywords: *Training devices, *Inspection, *Guidelines, *Water treatment, *Potable water, Instructors, State government, Public health, Environmental sanitation, Forms(Paper), Water management, Water distribution(Applied), Safety measures, Regulations, Water sources, Pumping, Sanitary engineering, Water storage, *Small systems, Safe Drinking Water Act.

PB93-115889/REB PC A09/MF A02
Sanitary Survey Training: Instructor's Guide for Sanitarians of Micronesia.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Sep 89, 183p EPA/570/9-88/004
See also PB93-115871.

The instructor's Guide has been developed as an aid to Micronesian agencies who provide instruction to inspectors of water systems. It is based on the minimum information that an inspector with limited experience needs to know to successfully assess a public water system. The manual does not provide technical detail on every facet of a water system, nor is it intended to provide the student with all of the background information necessary to provide technical assistance.

Keywords: *Training devices, *Inspection, *Water treatment, *Potable water, *Guidelines, *Micronesia, Instructors, Visual aids, Environmental sanitation, Forms(Paper), Sanitary engineering, Water sources, Water distribution(Applied), Safety measures, Water management, Environmental surveys, Pumping, Small systems.

PB93-115905/REB PC A03/MF A01
Underground Injection Control Program. Annual rept.
Environmental Protection Agency, Washington, DC. Office of Drinking Water.
Dec 88, 32p EPA/570/9-89/003

The annual report outlines the Underground Injection Control (UIC) Program's accomplishments including EPA oversight activities, data management, regulation of the UIC universe, development of a comprehensive UIC enforcement program, and program enhancement. The regulations define five classes of wells: injection of municipal or industrial waste (including hazardous waste) below the deepest USDW; injection related to oil and gas production; injection for mineral recovery; injection of hazardous or radioactive waste into or above a USDW; and all injection practices not included in the other four groups.

Keywords: *Water pollution abatement, *Pollution regulations, *Injection wells, Hazardous materials, Waste management, Ground disposal, Plumes, State programs, US EPA, Minerals, Enhanced recovery, Potable water, Water sources, Implementation, Permits, Law enforcement, Compliance, *Underground Injection Control Program, Safe Drinking Water Act, Resource Conservation and Recovery Act.

PB93-115913/REB PC A05/MF A01
Environmental Protection Agency, Washington, DC. Office of Ground-Water Protection.
Wellhead Protection Strategies for Confined-Aquifer Settings.
Texas Univ. at Austin. Bureau of Economic Geology.
C. W. Kreitler, and R. K. Senger. Jun 91, 84p EPA/570/9-91/008
Sponsored by Environmental Protection Agency, Washington, DC. Office of Ground-Water Protection.

The 1986 Amendments to the Safe Drinking Water Act created the Wellhead Protection Program. Through this program, the EPA assists states in protecting areas surrounding public drinking water supply wells against contamination. This document was developed to provide technical information to the states in their implementation of wellhead protection programs.

Keywords: *Water pollution abatement, *Aquifers, *Water wells, *Potable water, Confined water, State implementation plans, Water supply, Groundwater recharge, Technical assistance, Geology, Hydrology, Water chemistry, *Wellhead Protection Program, Safe Drinking Water Act.

PB93-115921/REB PC A03/MF A01
Environmental Protection Agency, Washington, DC. Office of Ground-Water Protection.
Why do Wellhead Protection. Issues and Answers in Protecting Public Drinking Water Supply Systems.
Texas Univ. at Austin. Bureau of Economic Geology.
K. McCormack. Sep 91, 25p EPA/570/9-91/014
Color illustrations reproduced in black and white. Sponsored by Environmental Protection Agency, Washington, DC. Office of Ground-Water Protection.

The booklet briefly treats these topics: wellhead protection, trends in EPA action policy, public health protection, the cost of prevention versus the cost of remediation, the benefits of targeting resources in wellhead protection, pollution prevention, industrial development, and avoiding the cost of regulation.

Keywords: *Potable water, *Water pollution abatement, *Water wells, Water supply, Trends, US EPA, Environmental policy, Public health, Remedial action, Environmental protection, Industrial plants, Regulations, State programs, *Wellhead Protection Program.

PB93-115939/REB PC A08/MF A02
General Information on Applying for Registration of Pesticides in the United States.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Jun 89, 154p

The instruction manual, which is divided into 18 chapters, is only intended to provide a general overview and guidance for persons seeking to register a pesticide in the United States. Every attempt has been made to make the information contained in the Instruction Manual accurate and current, however, changes in the Federal pesticide law (Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), regulations, policies and requirements are an ongoing process. Thus, changes may occur. This is the first instruction manual which has been developed in an effort to provide general guidance to applicants and registrants on registering pesticides in the United States.

Keywords: *Licenses, *Pesticides, *United States, Manuals, Requirements, Amendments, Compliance, Tolerances, Fees, State government, Regulations, *Registration.

PB93-115954/REB PC A04/MF A01
Protecting the Environment: A Research Strategy for the 1990s. Draft rept.
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Apr 89, 73p

About 30 years ago, the authors became conscious as a nation that our local environments were deteriorating: rivers, lakes, and estuaries were dirty, our city air was unhealthy to breathe, and the water is unsafe to drink. They looked at the basic research EPA is currently conducting and asked what changes would be needed to ensure that they will have the fundamental scientific information needed to formulate solutions to future environmental problems.

Keywords: *Environmental protection, *Research projects, Ecology, Risk assessment, Public health, Grants, Exposure.

PB93-115970/REB PC A02/MF A01
National Pesticide Survey: Glossary.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
1990, 9p
See also PB93-116010.

The U.S. Environmental Protection Agency (EPA) has completed its five-year National Survey of Pesticides in Drinking Water Wells (NPS). A joint project of EPA's Office of Drinking Water (ODW) and Office of Pesticide Programs (OPP), the Survey was designed to assess the extent and severity of the presence of pesticides and nitrate in drinking water wells nationwide, and the relationship of pesticide use and ground-water vulnerability to the presence of pesticides and nitrate. This glossary defines terms relating to the Survey design, implementation, and results. The definitions apply specifically to the Survey and may have additional meanings when used in other circumstances.

Keywords: *Pesticides, *Water pollution detection, *Water analysis, *Potable water, *Quality assurance, *Dictionaries, Water wells, US EPA, Design criteria, Implementation, Water quality, *National Pesticide Survey, *NPS methods.

PB93-115988/REB PC A03/MF A01
National Pesticide Survey: Project Summary.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.

1990, 13p
See also PB93-115970.

The U.S. Environmental Protection Agency (EPA) has completed its five-year National Survey of Pesticides in Drinking Water Wells (NPS). This fact sheet provides an overview of the Survey and a summary of Survey findings.

Keywords: *Water pollution detection, *Water analysis, *Pesticides, *Potable water, *Quality assurance, Water wells, US EPA, Environmental surveys, Water pollution sampling, Tables(Data), Maximum permissible exposure, Water quality, Statistical analysis, Study estimates, Concentration(Composition), *National Pesticide Survey, *NPS methods 1-9, Maximum contaminant levels.

PB93-115996/REB PC **A03**/MF **A01**
National Pesticide Survey: Summary Results of EPA's National Survey of Pesticides in Drinking Water Wells.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
1990, 18p
See also PB93-115988.

The U.S. Environmental Protection Agency (EPA) has completed its five-year National Survey of Pesticides in Drinking Water Wells (NPS). This fact sheet provides an overview of the initial findings of the Survey. EPA designed the Survey with two principal objectives: (1) to determine the frequency and concentration of the presence of pesticides and nitrate in drinking water wells nationally; and (2) to improve EPA's understanding of how the presence of pesticides and nitrate in drinking water wells is associated with patterns of pesticide use and the vulnerability of ground water to contamination. The focus of the Survey was on the quality of drinking water in wells, rather than on the quality of ground water, surface water, or drinking water at the tap. The Survey was designed to yield valuable information on both the frequency and levels of pesticides, pesticide degradates, and nitrate present in rural domestic (private) wells and community (public) drinking water wells on a nationwide basis. The Survey, however, was not designed to provide an assessment of pesticide contamination in drinking water wells at the local, county, or State levels.

Keywords: *Water pollution detection, *Water analysis, *Pesticides, *Potable water, *Quality assurance, Water wells, Environmental surveys, Water quality, Water pollution sampling, Concentration(Composition), Pesticide residues, US EPA, *National Pesticide Surveys.

PB93-116002/REB PC **A02**/MF **A01**
National Pesticide Survey: Survey Design.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
1990, 9p
See also PB93-115996.

The U.S. Environmental Protection Agency (EPA) has completed its five-year National Survey of Pesticides in Drinking Water Wells (NPS). The focus of the Survey was on the quality of water in drinking water wells before treatment rather than on the quality of drinking water at the tap. The Survey does not provide a representative assessment of the presence of pesticides or nitrate for specific local areas, counties, or States, nor does it assess the presence of pesticides or nitrate in surface or ground water. This fact sheet describes the key elements of the Survey design, including design tasks, scheduling, questionnaires, and design review. These elements ensure that the design was statistically sound and capable of producing information of a known and useful quality.

Keywords: *Water pollution detection, *Water analysis, *Pesticides, *Potable water, *Quality assurance, Water quality, Environmental surveys, Assessments, Design criteria, Questionnaires, Water wells, Reviews, Water pollution sampling, US EPA, *National Pesticide Survey.

PB93-116010/REB PC **A03**/MF **A01**
National Pesticide Survey: Survey Analytes.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
1990, 17p
See also PB93-116002.

The U.S. Environmental Protection Agency (EPA) has completed its five-year National Survey of Pesticides in Drinking Water Wells (NPS). A joint project of EPA's Office of Drinking Water (ODW) and Office of Pesticide Programs (OPP), the Survey was designed to assess the extent and severity of the presence of pesticides and nitrite in drinking water wells nationwide, and the relationship of pesticide use and ground-water vulnerability to the presence of pesticides and nitrate. In designing the NPS, EPA selected chemicals (called Survey analytes) to test for, and identified appropriate testing methods (called Survey analytical methods) for the detection of these analytes. This fact sheet provides a table of useful information about each of the 127 Survey analytes.

Keywords: *Water pollution detection, *Water analysis, *Pesticides, *Potable water, *Quality assurance, Environmental surveys, Maximum permissible exposure, Concentration(Composition), Tables(Data), Water pollution sampling, Regional analysis, Risk assessment, Water wells, US EPA, *National Pesticide Survey, *NPS methods 1-9, Maximum contaminant levels.

PB93-116028/REB PC **A03**/MF **A01**
Assessing the Environmental Consumer Market.
Environmental Protection Agency, Washington, DC. Office of Policy, Planning and Evaluation.
R. M. Kashmanian. Apr 91, 35p

The report documents the consumer response to over 40 examples of environmentally-oriented goods and services promoting source reduction, recycling, natural resource conservation and protection, animal species preservation, etc. Consumer responses to environmentally-oriented products is especially important since a key to success in recycling is consumer demand for recycled materials in products and packaging. The report provides useful information to industry and others interested in stimulating demand for environmentally-oriented products (such as those using recycled and recyclable materials).

Keywords: *Markets, *Consumer protection, Packaging, Environmental impacts, Recycling, Environmental surveys, Damage assessment, Marketing, Standards, Marking, Conservation, Case studies.

PB93-116069/REB PC **A06**/MF **A02**
Compendium of Federal Financial Assistance Programs: Targeting Programs for State and Local Ground-Water Protection.
Environmental Protection Agency, Washington, DC. Office of Ground-Water Protection.
Sep 90, 102p EPA/440/6-90/008

Contents: Agricultural Conservation; Agricultural Education/Technical Assistance; Agricultural Pollution Control; Agricultural Research; Community Development; Drinking Water Protection; Emergency Water Assistance; Environmental Protection; Farm Ownership Credit; Hazardous Waste Management; Pesticides Control; Rural Development; Solid Waste Management; Superfund; Toxic Substances; Underground Storage Tanks; Water Pollution Control; and Water Resources Development.

Keywords: *Ground water, *Economic assistance, *Project management, *Water pollution control, Monitoring, Agriculture, Conservation, Water supply, Protection, Grants, Pesticides, State government, Local government, Credit, Farms, Rural areas, Loans, Solid waste disposal, Toxicity, Storage tanks, Technical assistance, *Drinking water, Ownership.

PB93-116077/REB PC **A05**/MF **A02**
Saving Bays and Estuaries: A Primer for Establishing and Managing Estuary Programs. Appendices G, H, and I.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Sep 90, 99p EPA/503/8-90/005
See also PB91-145474.

The appendix of Saving Bays and Estuaries is: A Primer for Establishing and Managing Estuary Projects. The Primer, which describes the National Estuary Program's origin, statutary provisions, and approach, is designed for EPA's program and Regional offices, coastal States, and other interested parties. For more information, contact an EPA Regional office. Section 320 of the Clean Water Act provides for the development of Comprehensive Conservation and Management Plans (CCMPs) for estuaries of National significance. To ensure the greatest return on resources spent, it is often necessary to document the economic benefits associated with alternative management strategies.

Keywords: *Economic analysis, *Water pollution abatement, *Estuaries, Statutes, Manuals, Benefit cost analysis, Sources, Water pollution control, Habitats, Improvement, Agriculture, Industries, Navigation, Recreation, Fishing, Government agencies.

PB93-116085/REB PC **A05**/MF **A01**
Federal Insecticide, Fungicide, and Rodenticide Act as Amended.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Oct 88, 76p EPA/540/09-89/012

The report discusses the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) as amended. Some of the topics covered are registration; permits; inspection; use of restricted use pesticides; law enforcement; unlaw acts; administrative procedures; disposal and transportation; and identification of pests.

Keywords: *Pesticides, *Pest control, Pollution regulations, Law enforcement, Penalties, Administrative procedures, Inspection, Waste disposal, Transportation, Pests, *Federal Insecticide Fungicide and Rodenticide Act, Registration, Reregistration.

PB93-116093/REB PC **A03**/MF **A01**
Superfund Innovative Technology Evaluation (SITE) Program.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1991, 21p EPA/540/8-91/005
See also PB88-242961.

The U.S. Environmental Protection Agency's Superfund Innovative Technology Evaluation (SITE) Program, now in its fifth year, serves several purposes, including (1) the development and implementation of innovative treatment technologies for hazardous waste remediation and (2) the development and implementation of monitoring and measurement technologies for evaluating the nature and extent of hazardous waste site contamination. The update bulletin, developed as a part of the Technology Transfer Program, highlights progress over the past year under the Demonstration, Emerging Technologies, and Monitoring and Measurement Technologies Programs.

Keywords: *Hazardous materials, *Waste treatment, Monitoring, Sites, Biodeterioration, Incinerators, Soils, Washing, Chemical analysis, Photographs, Excavation, Profiles, Oxidation reduction reactions, *Superfund, SITE program, Vacuum extraction, National priorities list.

PB93-116127/REB PC **A03**/MF **A01**
Toxic Chemical Release Inventory Magnetic Media Submission Instructions. Section 313 of the Emergency Planning and Community Right-to-Know Act (Revised 1990 Version).
Environmental Protection Agency, Washington, DC. Office of Water Enforcement and Compliance.
Jan 91, 27p EPA/560/4-91/008
See also PB89-167506.

The document provides basic specifications for the use of magnetic media to submit EPA Form R reports required by section 313 of the Emergency Planning and Community Right-to-Know Act (Title III of the Superfund Amendments and Reauthorization Act of 1986), Public Law 99-499. The use of magnetic media can be a convenient and timesaving way to submit required information. The specifications and requirements presented in the document supplement the reporting requirements presented in the section 313 final rule (40 CFR Part 372). Submission of magnetic media reports does not relieve the submitter from any of the regulatory requirements of the section 313 final rule.

Keywords: *Data transmission, *Chemical compounds, *Toxic substances, *Specifications, Superfund, Reporting, Instructions, Inventories, Requirements, *Emergency Planning and Community Right-to-Know Act, *Magnetic media, Superfund Amendments and Reauthorization Act of 1986.

PB93-116143/REB PC **A04**/MF **A01**
Bioremediation of Hazardous Wastes.
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Dec 90, 67p EPA/600/9-90/041

Technologies for cleaning up hazardous wastes are often expensive, inappropriate for the site, or ineffective in handling complex mixtures of pollutants. Some of the most promising of the new technologies for solving hazardous waste problems involve the use of biological treatment systems. Because biological treatments appear to offer solutions to problems associated with conventional technologies, EPA's Office of Research and Development (ORD) initiated the Biosystems Technology Development Program, which is designed to anticipate rapidly increasing research needs that can be applied to our nation's enormous waste management problems. In February 1990, ORD hosted a Conference on Bioremediation of Hazardous Wastes in Arlington, Virginia, to discuss recent achievements of the Biosystems Technology Development Program and research necessary to bring biosystem technology into more widespread use. The document outlines the program, its objectives, and accomplishments. Extended abstracts are included to provide information on existing research projects.

Keywords: *Hazardous materials, *Waste disposal, *Waste treatment, Microorganisms control(Water), Bacteria, Fungi, Objectives, Abstracts, Biological treatment, Biosystems technology developing program.

PB93-116150/REB PC **A04**/MF **A01**
Environmental Monitoring and Assessment Program: 1990 Project Descriptors.
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Jun 90, 64p EPA/600/9-90/028
See also PB92-114479.

Contents: Air and Deposition; Landscape Characterization; Agroecosystems; Arid Ecosystems; Forest Ecosystems; Near Coastal Ecosystems; Surface Water Ecosystems, Wetland Ecosystems; Program Coordination; Integrated Assessment; and Monitoring Design and Research.

Keywords: *Environmental monitoring, *Pollution prevention, Quality assurance, Air pollution, Ecosystems, Trends, Agriculture, Arid land, Forest land; Coasts, Water supply, Surface waters, Design criteria, Sampling, Environmental Monitoring and Assessment Program, Wetlands, Biodiversity.

PB93-116168/REB PC **A06**/MF **A02**
Strategy for Environmental Health Research at EPA.
Environmental Protection Agency, Washington, DC. Office of Research and Development.
L. W. Reiter, and K. Sexton. Dec 90, 108p EPA/600/9-90/053

Major environmental legislation has given the U.S. Environmental Protection Agency (EPA) the regulatory tools it needs to protect our environment and public health. Environmental protection, however, requires more than legislative vehicles; appropriate regulatory decisions based on those laws must be founded on scientific data concerning the scope and magnitude of health risks associated with the environmental hazards to which the public is exposed. To address the broad range of environmental contaminants covered under various legislative statutes, HERL research must assist EPA in evaluating the health risks for diverse environmental agents. While the chemical and physical composition of these pollutants differs significantly, the evaluation of their health effects must address a common set of issues: exposure, or the extent to which humans are exposed to pollutants in the environment; dose, or the relationship between the exposure and the dose of the pollutant received at the site(s) of toxic action within the body; and effect, or the health impact from the pollutant dose. These fundamental issues form the risk assessment paradigm that underlies the research needs of all EPA regulatory program areas, and therefore they are central to the entire HERL program.

Keywords: *Environmental health, *Research projects, *Pollution control, Legislation, Hazards, Laboratories, Dosage, Response, Toxicology, Mixtures, Regulations, Microorganisms, Ultraviolet radiation, Risk assessments, Humans, Air pollution, Pesticides, Solid waste disposal, Disinfection, Indoor air pollution, Drinking water.

PB93-116176/REB PC **A12**/MF **A03**
Near Coastal Program Plan for 1991: Estuaries.
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Nov 90, 259p EPA/600/4-90/033

Environmental regulatory programs in the United States have been estimated to cost more than $70 billion annually. The Environmental Monitoring and Assessment Program (EMAP) is a nationwide initiative being implemented by EPA's Office of Research and Development (ORD). It was developed in response to the demand for information on the condition of the nation's ecological resources. The goal of EMAP is to assess and document the status and trends in the condition of the nation's forests, wetlands, estuaries, coastal waters, lakes, rivers, and streams, Great Lakes, agricultural lands, and arid lands on an integrated and continuing basis.

Keywords: *Ecology, *Coastal zone management, *Pollution control, *Estuaries, Environmental monitoring, Protection, Assessments, Forests, Wetlands, Lakes, Streams, Indicator species, Region analysis, Rivers, Sampling, Boundaries, Quality assurance, Environmental Monitoring and Assessment Program.

PB93-116226/REB PC **A06**/MF **A02**
Research to Improve Health Risk Assessments (RIHRA) Program.
Environmental Protection Agency, Washington, DC.
Jun 90, 104p EPA/600/9-90/038

To realistically assess the human health risks associated with exposures to environmental pollutants, the authors must understand a number of important physical, chemical, and biological processes and mechanisms. This suggests that real progress in enhancing the accuracy and precision of health risk assessments depend on the products of a research program focused on the underlying mechanisms of exposure, dose, and effects. Although much of the U.S. Environmental Protection Agency's (EPA's) base research program has been targeted historically on these issues, substantial benefits can still be gained from instituting a new, more focused research program aimed specifically at reducing the critical uncertainties associated with health risk assessments. The goal of the program, known formally as the Research to Improve Health Risk Assessments (RIHRA) Program, is to generate research results that will significantly improve the EPA's ability to assess human health risks. The RIHRA program is structured so that the research products are germane to a cross-section of the Agency's regulatory programs and risk assessment needs. The authors are confident that the mission-oriented research described in the document will provide the EPA with credible scientific findings that are relevant for risk assessment decisions.

Keywords: *Health hazards, *Risk assessment, *Toxic substances, Environmental exposure pathways, Dose-response relationships, Humans, Pharmacokinetics, Biological models, *Research to improve health risk assessments, *RIHRA Program.

PB93-116234/REB PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Handbook: Design and Installation of a Home Radon Reduction System-Sub-Slab Depressurization Systems in Low-Permeability Soils.
Southern Research Inst., Birmingham, AL.
C. S. Fowler, A. D. Williamson, B. E. Pyle, F. E. Belzer, and R. N. Coker. Jul 91, 54p EPA/625/6-91/029
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

Contents: About Radon; About Sub-Slab Depressurization; Gathering Information -- (House Summary Information; House Differential Pressures; Radon Entry Points; Sub-Slab Pressure Field Extension Measurements; Sub-Slab Pressure-Flow Characteristics; and Steps for Determining House Differential Pressures); Planning the System -- (Determining the Number of Suction Points; Determining Suction Hole Placement; Determining the Size and Capacity of the Fan to Be Used; and Determining the Optimum Pipe Size(s) for the System); Installing the System -- (Selecting the Specific Center for Drilling; Drilling the Slab Hole; Excavating the Suction Pits; Finishing the Suction Hole; Other Types of Installations; Piping Layout and Fan Placement); System Indicators and Labeling.

Keywords: *Air pollution control, *Indoor air pollution, *Radon, *Handbooks, *Houses, Design criteria, Soil properties, Permeability, Installing, *Subslab depressurization systems, Active Soil Depressurization Systems.

PB93-116259/REB PC **A10**/MF **A03**
Manual: Alternative Wastewater Collection Systems.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Oct 91, 220p EPA/625/1-91/024

Contents: Overview of Alternative Conveyance Systems; Pressure Sewer Systems; Vacuum Sewer Systems; Small Diameter Gravity Sewers; Design Examples.

Keywords: *Waste water, *Waste treatment, Collecting methods, Manuals, Sewers, Vacuum apparatus, Gravity drainage, Design criteria, Management, Cost analysis, Construction, Diameters, Pressure sewers.

PB93-116267/REB PC **A10**/MF **A03**
Environmental Protection Agency, Cincinnati, OH. Office of Ground Water and Drinking Water.
Handbook: Optimizing Water Treatment Plant Performance Using the Composite Correction Program.
Process Applications, Inc., Fort Collins, CO.
R. C. Renner, B. A. Hegg, H. Schultz, J. H. Bender, and E. M. Bissonette. Feb 91, 209p EPA/625/6-91/027
Prepared in cooperation with Eastern Research Group, Inc., Arlington, MA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Office of Ground Water and Drinking Water.

The handbook is an interim version of a source document for individuals responsible for improving the performance of existing surface water treatment plants using conventional and direct filtration unit processes to achieve compliance with the Surface Water Treatment Rule (SWTR). The SWTR covers all public water systems that use either surface sources as a raw water supply or ground-water sources determined to be under the direct influence of surface water. The handbook presents procedures for assessing a conventional or direct filtration plant's capability of achieving the 0.5 NTU turbidity requirement. A method is also presented for projecting if a plant will be able to meet the disinfection requirements in the SWTR guidance manual.

Keywords: *Handbooks, *Water treatment plants, *Surface waters, *Filtration, Disinfection, Standards compliance, Water pollution standards, Requirements, Performance evaluation, Implementation, Revisions, Water quality, *Composite Correction Program, Surface Water Treatment Rule.

PB93-116275/REB PC **A04**/MF **A01**
Handbook: Remediation of Contaminated Sediments.
Environmental Protection Agency, Washington, DC. Office of Research and Development.
T. Voskuil. Apr 91, 53p EPA/625/6-91/028
Prepared in cooperation with Equity Associates, Inc., Knoxville, TN.

The handbook focuses on small site contaminated sediments remediation with particular emphasis on treatment technologies. It is designed to provide a succinct resource booklet for government regulatory personnel, permit writers, remedial project manages, environmental scientists and engineers, plant owner/operators, environmental consultants, and other individuals with responsibilities for the management of contaminated sediments. The handbook is organized to address the major concerns facing contaminated sediment remediation. Chapter I describes the physical and chemical characteristics of sediment, with special emphasis on ways in which sediment property changes affect contaminant mobility. Chapter II addresses sediment toxicity assessment and describes the current status of the EPA effort to address this important topic. Chapter III discusses sampling techniques and analytical and modeling methods used to

characterize contaminated sediments. Chapter IV describes removal and transport options. Chapter V presents pre-treatment technologies. Chapter VI, the primary focus of the handbook, describes four major classes of treatment technologies. The chapter offers a comprehensive overview of specific treatment technologies and addresses applicability, limitations, and demonstrated results; it also presents references for further information. Finally, Chapter VII reviews disposal alternatives for contaminated sediments that are not treated.

Keywords: *Sediments, *Pollution control, Contamination, Sampling, Physical properties, Chemical properties, Removal, Environmental transport, Dewatering, Toxicity, Handbooks, *Remedial action.

PB93-116283/REB PC **A03**/MF **A01**
Seminar Publication. Medical and Institutional Waste Incineration: Regulations, Management, Technology, Emissions, and Operations.
Environmental Protection Agency, Washington, DC. Office of Research and Development.
J. Sales, L. G. Doucet, and A. C. Jones. Dec 91, 50p
EPA/625/4-91/030
Report on a series of 5 seminars.

Many medical waste incinerators in the United States are not designed to adequately handle the complex waste streams generated by modern medical facilities. Issues of concern to both the public and medical facility owners/operators are: What are the adverse health and environmental effects from improper handling and disposal of generated wastes. What can I do with waste generated at my facility. Do regulations exist to protect the public. A series of five seminars was held, beginning in October, 1989, in Providence, Rhode Island, and concluding in February, 1990, in Tallahassee, Florida. The document is a summary of the material presented at these seminars.

Keywords: *Medical wastes, *Incinerators, *Waste treatment, *United States, Waste management, Emission, Operations, National government, Regulations, State government, Local government, Waste disposal, Ratings, Waste characterization.

PB93-116291/REB PC **A05**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Research and Development.
User's Guide: Strategic Waste Minimization Initiative (SWAMI) Version 2.0: A Software Tool to Aid in Process Analysis for Pollution Prevention.
PEER Consultants, Inc., Dayton, OH.
Jan 92, 87p EPA/625/11-91/004
Contract EPA-68-03-3490
Prepared in cooperation with Dayton Univ., OH. Research Inst. Sponsored by Environmental Protection Agency, Washington, DC. Office of Research and Development.

The purpose of the SWAMI software is to help the user identify waste minimization opportunities, set up a procedure to prioritize those opportunities, and devise a strategy to take advantage of those opportunities that have the highest priority. The version of SWAMI has been developed to supply the capability of performing mass balance calculations and of generating graphic process flow diagrams.

Keywords: *Pollution prevention, *Waste minimization, Users guide, Mass balance, Software, Flow charts, Strategic waste minimization, Priorities.

PB93-116572/REB PC **A03**/MF **A01**
Implementation Plan for Removing Impediments to Migratory Fishes in the Chesapeake Bay Watershed (January-December 1991). Annual progress rept.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
1991, 33p
See also PB90-247479.

The Baywide Fish Passage Workgroup, under the auspices of the Chesapeake Bay Program's Living Resources Subcomittee, met throughout 1991 to coordinate fish passage issues pertinent to the Chesapeake Bay and its drainages. In 1991 the Workgroup placed a major emphasis on inventorying and prioritizing fish passage obstructions. State and federal agencies involved in the Workgroup continued their multi-faceted approach to establishing fish passage. The Workgroup and its representative agencies have continued a high level of communication and coordination with various other state and federal agencies. The primary emphasis of the workgroup in 1992 will shift to exploring various funding strategies.

Keywords: *Fishways, *Animal migrations, *Chesapeake Bay, *Maryland, Watersheds, Removal, Sites, Ladders, Weir, Streams, Financing, Rock Creek, Inventories, Blocking, Impediments, Fish Passage Program, Striped bass.

PB93-116580/REB PC **A03**/MF **A01**
Living Resources Monitoring Plan: Annual Progress Report.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
1991, 21p* CBP/APR-92/104
See also PB89-179873.

This is the second annual report on progress in implementing the Chesapeake Bay Living Resources Monitoring Plan (Governance Commitment Number 5 of the 1987 Chesapeake Bay Agreement, adopted July 1988). Highlights: Analytical efforts on juvenile finfish seining surveys; A workshop on zooplankton monitoring was held in September 1991; A Wetlands Monitoring Workshop has been scheduled for April 1992. It will evaluate the design and implementation of tidal and non-tidal wetlands mapping and monitoring; Maryland has implemented improved sampling and statistical design of its fall oyster survey.

Keywords: *Resource management, *Chesapeake Bay, *Environmental monitoring, Ecosystems, Surveys, Meetings, Zooplankton, Sampling, Mapping, Design, Finfish, Seining, Wetlands.

PB93-116978/REB PC **A05**/MF **A01**
Army Medical Research and Development Command, Fort Detrick, MD.
Health Advisory for Diphenylamine (DPA). Final rept.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
B. R. Das, M. B. Deardorff, and W. C. Roberts. Sep 92, 90p
Sponsored by Army Medical Research and Development Command, Fort Detrick, MD.

The Health Advisory (HA) provides information on the health effects, analytical methodology and treatment technology that would be useful in dealing with Diphenylamine (DPA) contamination of drinking water. Diphenylamine is classified as Group D, not classifiable as to human carcinogenicity; the category is for chemicals with inadequate human and animal evidence of carcinogenicity and for chemicals for which no data are available. Health Advisories describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. The HAs, developed by the US Environmental Protection Agency, Office of Water (OW), are not legally enforceable Federal standards and are subject to change as new information becomes available. Health Advisories are developed for One-day, Ten-day, Longer-term and Lifetime exposures based on data describing noncarcinogenic end points of toxicity. For those substances that are known or probable human carcinogens, according to the EPA classification scheme, Lifetime HAs are not recommended.

Keywords: *Water pollution effects(Humans), *Public health, *Potable water, *Toxicology, *Diphenylamine, Risk assessment, Environmental health, Exposure, Water treatment, Water quality, Pharmacokinetics, Aromatic organic compounds, Water pollution effects(Animals), Laboratory animals, Carcinogens, Explosives, Propellants, Environmental transport, *Health advisory, CAS 122-39-4.

PB93-116986/REB PC **A05**/MF **A01**
Army Medical Research and Development Command, Fort Detrick, MD.
Data Deficiencies, Problem Areas, and Recommendations for Additional Database Development for p-Chlorophenyl Methyl Sulfide, -Sulfoxide, and -Sulfone (PCPMS, PCPMSO, and PCPMSO2). Final rept.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
M. E. Brower, M. B. Deardorff, and W. C. Roberts. Sep 92, 79p
Sponsored by Army Medical Research and Development Command, Fort Detrick, MD.

The report was developed to review the toxicology of p-chlorophenyl methyl sulfide, -sulfoxide, and -sulfone in consideration of their human health effects when ingested in water. The available information is not sufficient to develop Drinking Water Health Advisories (HAs); therefore, the report provides recommendations for additional research that would allow HAs to be developed. The data deficiency report provides information on the health effects, analytical methodology and treatment technology of p-chlorophenyl methyl sulfide, -sulfoxide, and -sulfone.

Keywords: *Environmental health, *Water pollution effects, *Toxicology, Potable water, Information transfer, Reviews, Pesticides, Herbicides, Sulfur organic compounds, Pharmacokinetics, Laboratory animals, Recommendations, Exposure, Public health, Occupational safety and health, Ingestion(Biology), Environmental transport, Comparison, Water treatment, Carcinogens, *Sulfide/chlorophenyl methyl, *Sulfoxide/chlorophenyl methyl, *Sulfone/chlorophenyl methyl, CAS 123-09-1, Health advisory.

PB93-116994/REB PC **A03**/MF **A01**
Army Medical Research and Development Command, Fort Detrick, MD.
Data Deficiencies, Problem Areas, and Recommendations for Additional Database Development for Tetranitromethane (TNM). Final rept.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
W. L. McLellan, B. R. Das, and W. C. Roberts. Sep 92, 46p
Sponsored by Army Medical Research and Development Command, Fort Detrick, MD.

There is no information on the absorption, distribution, excretion, or metabolism of ingested or inhaled TNM in humans or experimental animal species. The report was developed to review the toxicology of Tetranitromethane in consideration of its human health effects when ingested in water. The available information is not sufficient to develop Drinking Water Health Advisories (HAs); therefore, the report provides recommendations for additional research that would allow HAs to be developed. The data deficiency report provides information on the health effects, analytical methodology and treatment technology of Tetranitromethane.

Keywords: *Environmental health, *Water pollution effects, *Air pollution effects(Humans), *Toxicology, Potable water, Environment effects, Environmental transport, Exposure, Ingestion(Biology), Pharmacokinetics, Water treatment, Public health, Occupational safety and health, Laboratory animals, Nitrogen organic compounds, Reviews, Information transfer, Munitions industry, Recommendations, Data processing, *Methane/tetranitro, CAS 509-14-8, Health advisory.

PB93-117000/REB PC **A03**/MF **A01**
Data Deficiencies, Problem Areas, and Recommendations for Additional Database Development for Diethylene Glycol Dinitrate (DEGDN). Final rept.
Environmental Protection Agency, Washington, DC. Health and Ecological Criteria Div.
M. B. Deardorff, B. Ram Das, and W. C. Roberts. Sep 92, 47p
Prepared in cooperation with Army Medical Research and Development Command, Fort Detrick, MD.

The report was developed to review the toxicology of diethylene glycol dinitrate in consideration of its human health effects when ingested in water. The available information is not sufficient to develop Drinking Water Health Advisories (HAs); therefore, the report provides recommendations for additional research that would allow HAs to be developed. The data deficiency report provides information on the health effects, analytical methodology and treatment technology of diethylene glycol dinitrate.

Keywords: *Data bases, *Toxicology, *Chemical water pollutants, *Plasticizers, Pharmacokinetics, Health hazards, Carcinogens, Humans, Animals, Explosives, *Diethylene glycol dinitrate.

PB93-117018/REB PC A05/MF A01
Army Medical Research and Development Command, Fort Detrick, MD.
Health Advisory for Dimethyl Methylphosphonate (DMMP). Final rept.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
J. C. Rowland, M. E. Brower, and W. C. Roberts. Sep 92, 86p
Sponsored by Army Medical Research and Development Command, Fort Detrick, MD.

The Health Advisory (HA) provides information on the health effects, analytical methodology and treatment technology that would be useful in dealing with Dimethyl Methylphosphonate (DMMP) contamination of drinking water. Based on available toxicity data the HA values for DMMP are given. Dimethyl Methylphosphonate is classified as Group C, possible human carcinogenicity; the category is for chemicals with inadequate/equivocal human and animal evidence of carcinogenicity. Health Advisories describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. The HAs, developed by the US Environmental Protection Agency, Office of Water (OW), are not legally enforceable Federal standards and are subject to change as new information becomes available. Health Advisories are developed for One-day, Ten-day, Longer-term and Lifetime exposures based on data describing noncarcinogenic end points of toxicity. For those substances that are known or probable human carcinogens, according to the EPA classification scheme, Lifetime HAs are not recommended.

Keywords: *Public health, *Water pollution effects(Humans), *Potable water, *Toxicology, Risk assessment, Phosphonic acid esters, Fire resistance coatings, Coatings, Chemical warfare agents, Pharmacokinetics, Environmental transport, Water quality, Exposure, Water treatment, Water pollution effects(Animals), Laboratory animals, Carcinogens, *Health advisory, *Phosphonic acid/dimethyl-(methyl-ester), CAS 756-79-6.

PB93-117026/REB PC A04/MF A01
Army Medical Research and Development Command, Fort Detrick, MD.
Health Advisory for 1,4-Dithiane. Final rept.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
M. B. Deardorff, B. Ram Das, and W. C. Roberts. Sep 92, 57p
Sponsored by Army Medical Research and Development Command, Fort Detrick, MD.

The Health Advisory (HA) provides information on the health effects, analytical methodology and treatment technology that would be useful in dealing with 1,4-Dithiane contamination of drinking water. Based on available toxicity data the HA values for 1,4-Dithiane are given. 1,4-Dithiane is classified as Group D, not classifiable as to human carcinogenicity; the category is for chemicals with inadequate human and animal evidence of carcinogenicity and for chemicals for which no data are available. Health Advisories describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. The HAs, developed by the US Environmental Protection Agency, Office of Water (OW), are not legally enforceable Federal standards and are subject to change as new information becomes available. Health Advisories are developed for One-day, Ten-day, Longer-term and Lifetime exposures based on data describing noncarcinogenic end points of toxicity. For those substances that are known or probable human carcinogens, according to the EPA classification scheme, Lifetime HAs are not recommended.

Keywords: *Public health, *Water pollution effects(Humans), *Potable water, *Toxicology, Water quality, Sulfur organic compounds, Exposure, Risk assessment, Chemical warfare agents, Mustard gas, Pharmacokinetics, Environmental transport, Water treatment, Water pollution effects(Animals), Laboratory animals, Carcinogens, *Health advisory, *Dithiane, Diethylene disulfide, CAS 505-29-3.

PB93-119568/REB PC A06/MF A02
Environmental Protection Agency, Seattle, WA. Region X.
Maritime Industrial Waste Project Reduction of Toxicant Pollution from the Maritime Industry in Puget Sound.
Municipality of Metropolitan Seattle-METRO, WA. Water Pollution Control Div.
Mar 92, 157p EPA/910/9-92/008
Grant EPA-CE-000201
Sponsored by Environmental Protection Agency, Seattle, WA. Region X.

Several methods for collection and treatment of wastewater and stormwater from boatyards and shipyards in Puget Sound were pilot-tested and recommended applications are described. Contaminants in wastewater from pressure-washing activities were measured and the contaminants of major concern are copper, lead, zinc and tin which occur primarily in suspended particles less than 60 microns in size. Treatment for discharge into sanitary sewer systems is feasible and cost effective, but treatment to receiving water standards is not. Two types of systems were considered practical: highly automated turn-key systems requiring minimal operator labor, and simple systems that can be assembled on site.

Keywords: *Reduction, *Industrial waste treatment, *Pollution control, *Puget Sound, Shipyards, Waste water, Washing, Cost analysis, Licenses, Lead(Metal), Copper, Zinc, Shipbuilding.

PB93-119576/REB PC A08/MF A02
Environmental Protection Agency, Seattle, WA. Region X.
Nutrients and Phytoplankton in Puget Sound.
Rensel Associates, Seattle, WA.
Jul 91, 156p EPA/910/9-91/002
Contract EPA-68-D8-0065
Prepared in cooperation with PTI Environmental Services, Bellevue, WA. Sponsored by Environmental Protection Agency, Seattle, WA. Region X.

The purposes of this report are (1) to provide a general review of the state of knowledge regarding nutrient-phytoplankton relationships in Puget Sound and (2) to quantify the relative nutrient sensitivity of various areas in the sound. For the purposes of this report, 'Puget Sound' refers to all of the inland marine and estuarine waters of Washington State, including Hood Canal and the Strait of Juan de Fuca, but excluding Grays Harbor, Willapa Bay, and the Columbia River estuary. Water quality problems associated with nutrient enrichment and phytoplankton blooms, such as depletion of dissolved oxygen, have been related to fish kills in poorly flushed embayments of Puget Sound. The geographic distribution and degree of shellfish toxicity related to phytoplankton-caused paralytic shellfish poisoning (PSP) has increased in Puget Sound since the mid-1970s. The occurrence of phytoplankton-related fish kills in mariculture facilities has also increased recently. This report summarizes the present state of knowledge about these conditions and identifies uncertainties about related ecological processes. Selected literature on known phytoplankton problems worldwide is reviewed to provide perspective about local conditions.

Keywords: *Puget Sound, *Nutrients, *Phytoplankton, *Water quality management, Washington(State), Algal blooms, Algae, Long term effects, Water pollution effects, Marine biology, Dissolved oxygen, Eutrophication, Regulations, Nitrogen, Phosphorus, Trends, Ranking, Ocean circulation, Environmental monitoring.

PB93-119616/REB PC A02/MF A01
Robert S. Kerr Environmental Research Lab., Ada, OK.
Bioventing Approach to Remediate a Gasoline Contaminated Subsurface. Book chapter.
Traverse Group, Inc., Traverse City, MI.
D. H. Kampbell, J. T. Wilson, and C. J. Griffin. c1992, 6p EPA/600/A-92/220
Contract EPA-DW69934659
Pub. in Emerging Technologies for Hazardous Waste Management: 1991 Book of Abstracts for the Special Symposium, Atlanta, GA., Industrial and Engineering Chemistry Division, American Chemical Society, October 1-3, 1991. See also PB92-121342. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Bioventing is a subsurface process using an air stream to enhance biodegradation of oily contaminants. Two pilot-scale bioventing systems were installed at a field site. Process operations began in October 1990. The field site is located at an air station. A spill in 1969 of about 100,000 kilograms aviation gasoline was caused by a broken underground transfer line. A major portion of the spilled product still persists as an oily-phase residue in a 80x360 meter plume. The subsurface is a uniform beach sand with the ground water level near five meters. Prior to startup of the venting systems, a grass cover was established and a nutrient solution was dispersed throughout the unsaturated subsurface. Subsurface air flow patterns are being determined with a tracer gas of sulfur hexafloride. Soil gas, core material, and underground water are being monitored to determine the extent of remediation. Objectives of the study are to demonstrate that surface emissions of gasoline are minimal, oily residue will be reduced to <100 mg fuel carbon/Kg core material, and the process will be applicable to full-scale remediation. Flow rate is based on a calculated residence time of 24 hours. Surface emission of fuel hydrocarbons have not exceeded 1 micrograms/liter soil gas.

Keywords: *Biodeterioration, *Soil gases, *Volatile organic compounds, *Oil pollution, *Hazardous materials, Biological treatment, Gasoline, Underground storage, Storage tanks, Microbial degradation, Design criteria, Evaluation, *Soil venting, Remedial action, Cleanup.

PB93-119624/REB PC A03/MF A01
Biomass Burning and the Production of Methane. Draft rept.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
J. S. Levine, W. R. Cofer, and J. P. Pinto. 22 Jan 92, 25p EPA/600/A-92/221
Prepared in cooperation with National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.

Biomass burning and its environmental implications have also become important research elements of the International Geosphere-Biosphere Program and the International Global Atmospheric Chemistry Project. The production of atmospheric methane (CH4) by biomass burning will be assessed. The production of methane and other gaseous and particle carbon species resulting from biomass burning will be outlined. Field measurements and laboratory studies to quantify the emission ratio of methane and other carbon species will be reviewed. The historic database suggests that global biomass burning is increasing with time and is controlled by human activities. Present estimates indicate that biomass burning contributes between about 20 to about 60 Teragrams per year of carbon in the form of methane to the atmosphere. This represents only 5 to 15% of the global annual emissions of methane. Measurements do indicate that biomass burning is the overwhelming source of CH4 in tropical Africa. However, if the rate of global biomass burning increases at the rate that it has been over the last few decades, then the production of methane from biomass burning may become much more important on a global scale in the future.

Keywords: *Biomass, *Methane, *Air pollution, *Environmental impact assessments, *Combustion products, Global aspects, Forecasting, Particles, Pollution sources, Carbon, Carbon monoxide, Non-methane hydrocarbons, Combustion efficiency.

PB93-119632/REB PC A05/MF A01
Physiological and Nonspecific Biomarkers.
Environmental Research Lab., Gulf Breeze, FL.
F. L. Mayer, D. J. Versteeg, M. J. McKee, L. C. Folmar, and R. L. Graney. c1992, 82p EPA/600/A-92/222
Pub. in Biomarkers Biochemical, Physiological, and Histological Markers of Anthropogenic Stress, p5-85. Prepared in cooperation with Environmental Research Lab., Gulf Breeze, FL., Mobay Corp., Stilwell, KS., Procter and Gamble Co., Cincinnati, OH., and Boyce Thompson Inst. for Plant Research, Ithaca, NY.

Physiological and nonspecific biomarkers have been used extensively in the laboratory to document and quantify both exposure to, and effects of, environmental pollutants. The chapter summarizes the advantages and disadvantages of physiological and nonspecific biomarkers. It lists the criteria to be used in selecting biomarkers to address specific ecological questions. After a general discussion of this topic, several specific biomarkers of possible utility in environmental monitoring of exposure and effects are described indi-

vidually. For each of these biomarkers, the chapter presents research needs for developing and validating ecologically meaningful biomarkers.

Keywords: *Environmental monitoring, *Biological markers, Energy metabolism, Growth, Enzymes, Hormones, Blood chemical analysis, Enzyme inhibitors, Reprints.

PB93-119840/REB PC **A03**/MF **A01**
Modeling Individual Exposure from Indoor Sources. Rept. for Jul 91-Jan 92.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
L. E. Sparks, B. A. Tichenor, and J. B. White. 1992, 27p EPA/600/A-92/937
Presented at American Society for Testing and Materials Meeting on Modeling IAQ, Pittsburgh, PA., April 27-28, 1992. See also PB90-110131, PB91-201095 and PB91-205153.

The paper discusses a model that allows analysis of individual exposure for a wide ange of sources and sinks. (NOTE: Individual exposure to air pollutants is determined by the behavior of indoor sources and sinks and activity patterns.) The discussion emphasizes exposures to volatile organic compounds (VOCs) from commonly used sources. The effects of source and sink behavior on exposure are complex. Important factors include source strength, source decay rate, rates to the sink, re-emissions from the sink, and such building operation parameters as ventilation rate. Sources provide the primary exposure and dominate exposure while the source strength is strong. Sink modify exposure by reducing peak concentrations and, because of re-emissions from sinks, by increasing the time of relatively high concentrations. Exposures from several sources are analyzed both with and without sinks and under a range of building operation scenarios. The need for standard scenarios in evaluating the effects of sources on individual exposure is discussed. Model concentration predictions are compared with data from an indoor air quality test house.

Keywords: *Indoor air pollution, *Public health, *Computerized simulation, *Pollution sources, *Air quality, Exposure, Air pollution effects(Humans), Residential buildings, Ventilation, Air flow, Volatile organic compounds, Concentration(Composition), Source terms.

PB93-119857/REB PC **A03**/MF **A01**
Critical Evaluation of Treatment Technologies with Particular Reference to Pump-and-Treat Systems. Symposium paper.
Robert S. Kerr Environmental Research Lab., Ada, OK.
S. G. Schmelling, J. W. Keeley, and C. G. Enfield. 1992, 20p EPA/600/A-92/224
Pub. in Elsevier Applied Science for SCI Water and Environmental Group. Proceedings of Contaminated Land Treatment Technologies, p220-234. See also PB90-235797, PB92-114461 and PB92-178938.

Ground-water extraction and treatment, or pump and treat, is the most commonly used technology for remediating contaminated ground water at hazardous waste sites in the United States. There are major limitations to using this technology for restoration of aquifers to drinking-water quality in a reasonable time frame. The major limitations to pump and treat technology, which are connected with the difficulty in extracting of contaminants from the subsurface, can be explained in terms of the basic processes controlling subsurface contaminant transport and fate. The same processes that limit the effectiveness of pump and treat limit most other aquifer remediation technologies, as well. It is important to understand and account for these processes when designing aquifer remediation projects. Research is being carried out by the United States Environmental Protection Agency and other organizations to reduce some of the limitations and improve the efficiency of pump and treat.

Keywords: *Water treatment, *Ground water, *Remedial action, *Hazardous materials, *Pumping, United States, Aquifers, Extraction, Potable water, Subsurface investigations, Design criteria, Environmental transport, Waste disposal, Performance evaluation, Reprints.

PB93-119865/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Survey of Protocols for Conducting Indoor Air Quality Investigations in Large Buildings. Symposium proceedings.
Research Triangle Inst., Research Triangle Park, NC.
R. C. Fortmann. Jun 92, 25p EPA/600/A-92/226
Contract EPA-68-02-4544
See also DE92 000658, PB88-150784, PB92-103167 and PB92-145374. Presented at the ASHRAE IAQ '92 Conference-Environment for People, San Francisco, CA., October 18-21, 1992. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Numerous investigations are conducted in large buildings each year to evaluate health and comfort complaints that building occupants perceive to be related to poor indoor air quality. Some guidelines have been developed for conducting indoor air quality investigations, but standardized building diagnostics protocols have not been developed. The purpose of the work was to compile information that might be used to develop standardized protocols. A computerized literature search and a mail-out survey were conducted. A number of reports describing indoor air quality investigation guidelines and protocols were identified. The recently-published EPA/NIOSH Building Air Quality document contained the most comprehensive guidance. A survey of other documents identified many common elements, particularly for the collection of information during the initial walk-through investigation phases.

Keywords: *Indoor air pollution, *Buildings, *Air quality, *Environmental engineering, Monitoring, Air sampling, Asbestos, Radon, Radioactive materials, Pollution sources, Fungi, Ventilation, Heating systems, Air conditioning, Occupational health and safety, Closed building syndrome.

PB93-119873/REB PC **A02**/MF **A01**
Numerical Simulation to Determine the Effects of Incident Wind Shear and Turbulence Level on the Flow Around a Building.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Y. Q. Zhang, A. H. Huber, S. P. S. Arya, and W. H. Snyder. 1992, 8p EPA/600/A-92/227
Pub. in Proceedings of International Symposium on Computational Wind Engineering, Tokyo, Japan, August 21-23, 1992. See also DE89010505 and LA-4370.

The effects of incident shear and turbulence on flow around a cubical building are being investigated by a turbulent kinetic energy/dissipation model (TEMPEST). The numerical simulations demonstrate significant effects due to the differences in the incident flow. The addition of upstream turbulence and shear results in a reduced size of the cavity directly behind the building. The accuracy of numerical simulations is verified by comparing the predicted mean flow fields with the available wind-tunnel measurements of Castro and Robins (1977). Comparing the authors' results with experimental data, the authors show that the TEMPEST model can reasonably simulate the mean flow.

Keywords: *Wind shear, *Buildings, *Computational fluid dynamics, *Turbulence, *Flow distribution, Computer programs, Velocity distribution, Energy dissipation, Turbulent flow, Accuracy, Computerized simulation, TEMPEST Computer program.

PB93-119881/REB PC **A03**/MF **A01**
Academia Sinica, Beijing (China).
Simulating the Effects of Upstream Turbulence on Dispersion Around a Building.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Y. Q. Zhang, S. P. S. Arya, A. H. Huber, and W. H. Snyder. 1992, 14p EPA/600/A-92/228
Pub. in International Summer Colloquium/International Symposium for Young Science on Climate (4th), Beijing, China, July 20-29, 1992. See also PB93-119873 and PB92-232453. Prepared in cooperation with North Carolina State Univ. at Raleigh. Dept. of Marine, Earth and Atmospheric Sciences, and National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Air Resources Lab. Sponsored

The effects of high turbulence versus no turbulence in a sheared boundary-layer flow approaching a building are being investigated by a turbulent kinetic energy/dissipation model (TEMPEST). The effects on both the mean flow and the concentration field around a cubical building are presented. The numerical simulations demonstrate significant effects due to the differences in the incident flow. The addition of upstream turbulence results in a reduced size of the cavity directly behind the building. The velocity deficits in the wake strongly depend on the upstream turbulence intensities. The accuracy of numerical simulations is verified by comparing the predicted mean flow and concentration fields with the wind tunnel measurements of Castro and Robins (1977) and Robins and Castro (1977, 1975). Comparing the results with experimental data, the authors show that the TEMPEST model can reasonably simulate the mean flow. The numerical simulations of the concentration fields due to a source on the roof-top of the building are presented. Both the value and the position of the maximum ground-level concentration are changed dramatically due to the effects of the upstream level of turblence.

Keywords: *Turbulence, *Buildings, *Computational fluid dynamics, *Flow distribution, *Wind shear, Computational grids, Velocity distribution, Computer programs, Turbulent flow, Energy dissipation, Computerized simulation, Accuracy, Turbulent boundary layer, Mathematical models, TEMPEST Computer program.

PB93-119899/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Pilot Study to Evaluate Methods for the Assessment of Exposure of Small Children to Pesticides in the Residential Environment. Rept. for Apr 91-Apr 92.
Research Triangle Inst., Research Triangle Park, NC.
R. G. Lewis, R. C. Fortmann, and D. E. Camann. 14 Sep 92, 35p EPA/600/A-92/229
See also PB90-152224, PB81-181570 and PB-275 966. Prepared in cooperation with Southwest Research Inst., San Antonio, TX. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

A pilot study was conducted to evaluate methods of assessment of exposure of infants and toddlers to pesticide residues around the household. Nine homes with children aged six months to five years were selected on the basis of pesticide indoor and outdoor use. House dust was collected at each house using a specially designed cyclone vacuum system. Dislodgeable residues were collected from floors by means of a polyurethane foam (PUF) roller weighted to simulate a 9 kg child. Technician's hand presses, followed by 2-propanol rinses, were performed for side-by-side comparison to the PUF roller. The hands of the children were similarly washed. Soil and entry-way dirt samples were also collected and air was sampled at the breathing heights of small children, i.e., 12 cm and 75 cm above the floor. All samples were analyzed for a list of 31 common household pesticides. Questionnaires were administered to participants regarding pesticide usage, child activities (including frequency of hand-to-mouth contact), and dietary habits. Results are discussed in terms of method performance and relative amounts of pesticides found in the various media sampled.

Keywords: *Pesticide residues, *Environmental exposure pathway, *Environmental persistence, *Children, Environmental monitoring, Environmental surveys, Contamination, Public health, Sampling.

PB93-119907/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Development of a Laboratory Method for Estimation of Hydrogen Chloride Emission Potential of Incinerator Feed Materials. Symposium paper.
Research Triangle Inst., Research Triangle Park, NC.
L. D. Johnson, R. C. Fuerst, T. J. Logan, and M. R. Midgett. 1992, 14p EPA/600/A-92/230
Contract EPA-68-02-4550
See also PB90-235854 Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

A laboratory method has been developed to provide an estimate of the amount of hydrogen chloride gas that will form during incineration of a waste. The method involves heating of a sample of the waste to 900 C in a tube furnace, removal of particles from the resulting gases by filtration, collection of hydrogen chloride gas in a water-filled impinger, and measurement of the collected HCl as chloride using ion chromatography. The original goal of the project was to develop a method which would allow accurate determination in the laboratory, of the amount of HCl formed upon full-scale incineration of a given hazardous waste feed material. Although the laboratory equipment and procedures performed as designed, the data show that results are very sensitive to materials of construction, availability of hydrogen, and probably other factors difficult to translate accurately from laboratory to full-scale equipment. It is recommended that the current interim procedure of using total chlorine in the waste feed to estimate worst case emissions be carried on as the permanent procedure. As specified in the interim procedure, sampling for HCl before and after the scrubber will be required for efficiency determination.

Keywords: *Hydrogen chloride, *Incineration, *Air pollution detection, *Waste disposal, *Hazardous materials, Combustion products, Chemical analysis, Study estimates, Ion chromatography, Experimental design, Laboratory equipment, Materials recovery.

PB93-120871/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Laboratory Simulation of Turbulent Convection Over an Urban Heat Island.
North Carolina State Univ. at Raleigh. Dept. of Marine, Earth and Atmospheric Sciences.
J. Lu, S. P. S. Arya, W. H. Snyder, and R. E. Lawson.
1992, 6p EPA/600/A-92/31
Pub. in AMS Symposium on Turbulence and Diffusion (10th), Portland, OR., September 29-October 2, 1992. (Preprint Volume). See also PB91-201410. Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Asses

A systematic experimental study of the heat-island-induced circulation under turbulent conditions was conducted in the laboratory for an idealized, circular heat island in an initially thermally stratified fluid (water) in a convection tank with no ambient flow. The primary objectives of the study were to obtain a better understanding of the mean and turbulent flow generated by the heat island and to identify the appropriate similarity parameters and scales for simulating such a flow. Three non-dimensional similarity parameters were derived from the governing equations of motion. They are the convection Reynolds number (Re), the Froude number (Fr), and the Prandtl number (Pr). The data indicate that at sufficiently large Re, turbulent convection in the main flow becomes independent of Re which is the basis of the laboratory simulation. These measurements are also compared with field data from several cities and they agree with each other satisfactorily.

Keywords: *Heat islands, *Urban areas, *Convection, Simulation, Atmospheric diffusion, Prandtl number, Froude number, Reynolds number, Fluid dynamics, Plumes, Boundary layer flow, Reprints.

PB93-120889/REB PC **A03**/MF **A01**
Development of an Improved Urban Airshed Modeling System.
Computer Sciences Corp., Research Triangle Park, NC.
J. M. Godowitch, R. T. Tang, and J. S. Newsom. 1992, 17p EPA/600/A-92/232
Presented at the Annual Air and Waste Management Association Meeting (85th), Kansas City, MO., June 21-26, 1992. See also PB85-191567, PB91-131227 through PB91-131268, PB92-145382 and PB92-108760. Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div., and Environmental Protection Agency, Research Triangle Park,

A research and development effort to improve certain physical processes simulated in the Urban Airshed Model (UAM) processor and model programs, and to update the computer software is described. The UAM is an Eulerian photochemical grid model designed to simulate the relevant physical and chemical processes leading to ozone formation over urban-scale domains. An important task is the development of a comprehensive, meteorological processor program capable of generating several model input data files. Key modules include algorithms for computing the three-dimensional wind, temperature, and water vapor fields, surface energy budget fluxes, mixing heights, vertical eddy exchange coefficients, three-dimensional photolysis rates, and pollutant deposition velocities. The UAM model code has been updated to accept the meteorological processor data files and has been consolidated due to the removal of computational routines for dry deposition and exchange coefficients. Test runs to verify the correct implementation of code changes and to assess the impacts of new methods on predicated concentrations are described. The evaluation plans for the upgraded modeling system and an intercomparison of results with the regulatory UAM model using the Southern California Air Quality field measurements are also outlined.

Keywords: *Research and development, *Computerized simulation, *Air pollution, Atmospheric chemistry, Meteorology, Ozone, Urban areas, Deposition, Three-dimensional calculations, Atmospheric models, Photochemical reactions, Revisions, Air quality, Comparison, *Urban Airshed Model, Eulerian photochemical grid model.

PB93-120897/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Stagnation Diffusion Observed in a Deeply Pooling Valley during STAGMAP.
National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div.
G. A. Briggs. 1992, 10p EPA/600/A-92/233
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Stagnation conditions are characterized by synoptic pressure gradients so weak that they have little or no effect on air flow near the ground. This flow and the turbulence accompanying it are driven mostly by surface heat flux inducing buoyancy, which interacts with terrain slopes. The resulting flows and diffusion patterns created by these flows are as varied as are topographies. Short-term diffusion is also strongly affected by uneven surface heating or cooling induced by various sun azimuths and elevations, uneven surface cover, soil type and moisture, and by uneven cloud shadowing. The endless possibilities makes the task of predicting 'worst case' concentrations from a particular source in a particular place seem almost impossible, but there is hope for useful predictions for time averaged impacts from arrays of many small sources, such as woodstoves. This is the primary focus of the experiment described in the paper.

Keywords: *Stagnation point, *Air pollution, Valleys, Heat flux, Atmospheric diffusion, Aerosols, Tracer studies, Atmospheric models, Field tests, *Stagnation Model Analysis Program, *Medford air basin.

PB93-120905/REB PC **A03**/MF **A01**
Model Calculations of the Annual Atmospheric Deposition of Toxic Metals to Lake Michigan. Interim rept. Apr 91-May 92.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
T. L. Clark. 1992, 12p EPA/600/A-92/234
Presented at the Annual Meeting of the Air and Waste Management Association (85th), Kansas City, MO., June 23-27, 1992. See also PB86-171394 and PB88-190509. Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div., and Computer Sciences Corp., Research Triangle Park, NC.

The 1990 Clean Air Act Amendments include specific provisions to study significant sources of atmospheric deposition of toxic substances and their impacts on the health and welfare of the Great Lakes and other major water bodies. The act also requires an assessment of the atmospheric loadings to the Great Lakes and other major water bodies. However, because of cost and technological limitations, spatially-integrated atmospheric deposition to a body of water can not be directly determined. Until recently, the total annual atmospheric deposition was estimated from the product of (1) spatially-limited, land-based, rural air concentrations, (2) constant theoretical or empirical atmospheric removal rates, and (3) the surface area of the water body. Although it is expedient, this approach, with its inherent assumptions, has several serious drawbacks that cast doubts on the spatially-integrated atmospheric loadings. Comprehensive atmospheric deposition models based on future enhanced versions of currently-available regional air pollution models offer a more accurate alternative to this traditional approach. However, since a better understanding of the emission rates and atmospheric processes governing airborne toxic deposition is a prerequisite for the enhanced model versions, these comprehensive models will not be operational within the next several years. In the interim, the Regional Lagrangian Model of Air Pollution (RELMAP), a simple atmospheric deposition model, was applied to quantify the expected range of annual deposition amounts of toxic trace metals to Lake Michigan. These metals are arsenic (As), cadmium (Cd), chromium (Cr), lead (Pb), and nickel (Ni).

Keywords: *Air water interactions, *Water pollution, *Deposition, *Air pollution, *Metals, *Mathematical models, Study estimates, Lake Michigan, Toxic substances, Atmospheric models, Great Lakes, Spatial distribution, Water quality, Concentration(Composition), Urban areas, Clean Air Act, Forecasting, Regional Lagrangian Model of Air Pollution.

PB93-120913/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Multizonal Mass Balance Modeling of Benzene Dispersion in a Private Residence.
Computer Sciences Corp., Research Triangle Park, NC.
A. Lansari, A. Lindstrom, B. Templeman, and J. S. Irwin. 1992, 9p EPA/600/A-92/235
Contract EPA-68-WO-0043
Proceedings of the 1992 U.S. Environmental Protection Agency/Air and Waste Management Association Symposium on Measurement of Toxic and Related Air Pollutants, Durham, NC., May 1992. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

A residence in Roxboro, NC, was found to have its well-water supply contaminated with benzene (approx 300 microgram/l) and other organic compounds. The residents of the house do not currently drink the water, but they use it for daily showers. A study was designed to monitor and model short-term benzene dispersion within the house during and after a shower. A multizonal mass balance model, CONTAM88, was used to predict interzonal air flow rates and benzene concentration distributions within the house. The idealization of the building was created using NBSAVIS, a preprocessor to CONTAM88. Simulation results showed that the highest concentration occurred in the shower stall. Benzene concentrations in the master bedroom and other rooms were lower. Simulated benzene concentration distributions showed that benzene from the shower rapidly dispersed in the house, and reached equilibrium in all the rooms in less than 30 minutes after the shower. These results were supported by SF6 experimental data. Benzene samples were collected using glass, gas-tight syringes in the shower stall and at various locations in the house. The average benzene concentration after a 20-minute shower was 978 microgram/cu m in the shower stall, 263 microgram/cu m in the master bathroom, and 70 microgram/cu m in the master bedroom. Simulated and average measured benzene concentrations yielded a similar behavioral trend. It was concluded that multizonal mass balance models may be useful in designing field study monitoring strategies.

Keywords: *Benzene, *Indoor air pollution, *Houses, *Air pollution monitoring, *Mass balance, *Mathematical modeling, Water pollution, Water supply, Air water interactions, Air flow, Dispersion, Concentration(Composition), Tracer studies, Residential buildings, CONTAM88 model, Roxboro(North Carolina).

PB93-120921/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Comparison of Modeled Concentration Profiles Using Site-Specific and Constant-Condition Meteorological Data for the ISCLT and PAL Models.
Computer Sciences Corp., Research Triangle Park, NC.
J. Streicher, and B. Templeman. 1992, 8p EPA/600/A-92/236
Contract EPA-68-WO-0043
Proceedings of the Environmental Protection Agency/Air and Waste Management Association Symposium on Measurement of Toxic and Related Air Pollutants, Durham, NC., May 1992. See also PB88-171475 and PB88-171483. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Modeling atmospheric pollutant dispersion from ground-level area sources generally requires site-specific, or at least site-representative meteorological data. Models that predict annual-average concentrations as a function of radial distance and azimuthal direction accept data in standard formats such as STability ARray (STAR), or hourly (CD-144) format. The Industrial Source Complex-Long Term (ISCLT) model and the Point, Area, Line Source (PAL) model are two examples. However, an air quality screening analysis may only require estimates of the annual-average radial maximum concentrations. Modeled annual-average radial maximum concentrations (azimuth-independent) are less sensitive to the variations inherent in site-specific meteorological data. Such a one-dimensional treatment does not fully utilize, and therefore may not require, the two-dimensional information that is available in conventional meteorological data formats such as STAR or CD-144. Is there a single combination of atmospheric stability, wind speed, and frequency of occurrence (i.e., an azimuth-independent constant-condition pseudo-meteorological data input) which can provide a useful screening estimate of the annual-average radial maximum concentration profiles for ground-level area sources. A comparison of modeled annual-average radial maximum concentration profiles, from a small area source, was made between several constant conditions and meteorological data from several sites.

Keywords: *Air pollution, *Atmospheric models, Simulation, Plumes, Profiles, Meteorological data, Reprints, *Air pollutant concentration profiles, Point Area Line Source Model, Industrial Source Complex Long Term Model.

PB93-120939/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Study of the Effects of Acidic Pollutants on Automotive Finishes.
North Carolina State Univ. at Raleigh.
N. Rungsimuntakul, D. White, R. Fornes, R. Gilbert, and J. Spence. 1992, 8p EPA/600/A-92/237
Contract EPA-R-814121
See also PB-222 377. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Automotive finishes of various compositions on metal substrates were exposed vertically in a smog chamber to UV and acidic atmospheres. The pollutants were generated from combinations of SO2, NO, propylene, water, and air. Dews of different compositions were generated and collected twice a day. Spot tests were performed by placing drops of (100 microL) of dews on the surfaces of the paints and heating in an air-circulating oven at 90 C for 24 hours. Visual observation, reflection optical microscopy, profilometry, SEM, and EDS were used to examine surface damage. Various degrees of damage occurred depending upon the dew composition and surface properties. In general, the damage areas were in the form of rings with diameters smaller than the original drop. After rinsing and buffing, the damage was still visible. Microscopy and SEM revealed that the rings consisted of numerous small areas of damage and that swelling, pitting, blistering, and cracking had occurred. EDS showed aluminum and sulfur at the damage surface, while the surrounding area did not. Since the base coat contained Al flakes, this suggested that the acidic dew had penetrated through the top coat into the base coat.

Keywords: *Air pollution effects(Materials), *Motor vehicles, *Coatings, *Acid rain, *Acids, Paints, Ultraviolet radiation, Weathering, Test chambers, Profilometers, pH, Surface properties, Corrosion, Optical microscopy, Scanning electron microscopy, Environmental effects, Electron diffraction.

PB93-120947/REB PC **A03**/MF **A01**
Design of the Clean Air Act Deposition Monitoring Network. Symposium paper.
Environmental Protection Agency, Research Triangle Park, NC. Office of Research and Development.
D. M. Holland, R. Baumgardner, T. Hass, and G. Oehlert. 26 Aug 92, 25p EPA/600/A-92/238
See also PB91-100164 and PB85-114106. Prepared in cooperation with Wisconsin Univ.-Milwaukee, and Minnesota Univ., St. Paul.

The Clean Air Act Amendments (CAAA) of 1990 will have far-reaching effects on the monitoring of the deposition of atmospherically transported chemicals. The CAAA incorporate significant new regulatory requirements for emission reductions designed to reduce risks to public health and protect the natural environment. The paper presents the preliminary monitoring plan for a comprehensive network designed to provide adequate spatial coverage and reasonable temporal trend resolution for chemical deposition variables. While much of the network is regional or national in scope, it also includes a focus on increased monitoring in sensitive ecosystems areas such as high elevation sites and watersheds. The design process involved an evaluation of the uncertainty in the spatial prediction of unknown deposition levels at non-monitored sites and the ability of existing networks to detect and quantify temporal changes in precipitation sulfate.

Keywords: *Air pollution monitoring, *Acid rain, *Particulates, Network analysis, Pollution transport, United States, Air pollution, Atmospheric circulation, Clean Air Act Amendments.

PB93-120954/REB PC **E02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Atmospheric Deposition of Toxic Metals to Lake Michigan: Preliminary Annual Model Calculations.
Interim rept. Apr 91-May 92.
National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div.
T. L. Clark. 1992, 8p EPA/600/A-92/239
Presented at the Environmental Protection Agency/Air and Waste Management Association International Symposium of Measurement of Toxic and Related Air Pollutants, Durham, NC., May 1992. See also PB86-171394 and PB91-119669. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Concern is growing for the environmental water quality of the Great Lakes. Atmospheric deposition of toxic substances is recognized as a major pathway of contaminants to the water medium. To estimate the annual atmospheric loadings of five toxic metals--arsenic (As), cadmium (Cd), chromium (Cr), lead (Pb), and nickel (Ni)--to Lake Michigan, the Regional Lagrangian Model of Air Pollution (RELMAP) was applied using a preliminary 1985 airborne toxics emissions inventory developed by EPA for U.S. and Canadian anthropogenic sources. At 3-h intervals the model creates pollutant puffs containing particles with diameters of either 0.5 micrometers or 5.0 micrometers, transports them across the eastern North American domain, and calculates wet and dry deposition amounts for each unit-degree cell. Total direct deposition amounts to the lake are determined from these calculated amounts and a land-use inventory that defines the water surface portion of each cell.

Keywords: *Air water interactions, *Air pollution, *Water pollution, *Deposition, *Metals, *Mathematical models, Lake Michigan, Great Lakes, Water quality, Toxic substances, Wet methods, Dry methods, Study estimates, Particle size, Regional Lagrangian Model of Air Pollution.

PB93-120962/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Physical Damage Formation on Automotive Finishes Due to Acidic Reagent Exposure.
North Carolina State Univ. at Raleigh.
D. White, R. Fornes, R. Gilbert, A. Speer, and J. Spence. 1992, 8p EPA/600/A-92/240
Grant EPA-R-814121
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Several types of automotive finishes with clear coatings were exposed to drops of acidic reagents at 54 C. Surface damage was examined using visual observations, reflection optical microscopy, SEM, EDS, and profilometry. Reflection microscopy was the most useful technique for observing surface damage. Scanning electron microscopy provided sulfur mappings through the use of an EDS attachment. A chamber dew with pH level of 3.4 created in a smog chamber designed to simulate real environmental conditions was highly detrimental to the finishes with damage concentrated in a ring with a diameter less than the original drop size. The form of this damage suggests a free energy minimization process favoring a concentration of the damaging reagent at the edge of the evaporating drop where stable nuclei are thought to form. Continued heating of the samples after the drop evaporation resulted in damage that increased with time, with most of the visual damage located underneath material deposited from the evaporated drop.

Keywords: *Air pollution effects(Materials), *Coatings, *Motor vehicles, *Acid rain, *Acids, Exposure, Surface properties, Paints, Environmental effects, pH, Test chambers, Optical microscopy, Scanning electron microscopy, Profilometers, Electron diffraction.

PB93-120970/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Effect of Specimen Size and Orientation on the Atmospheric Corrosion of Galvanized Steel.
Brookhaven National Lab., Upton, NY.
J. W. Spence, F. W. Lipfert, and S. Katz. 1992, 8p EPA/600/A-92/241
Contract EPA-68-DO-6106
See also PB89-181259. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Most of the field data that have been gathered on atmospheric corrosion of metals over the years were obtained from standardized test specimens, for example 10x15 cm coupons mounted at 0 degrees to the horizontal facing south. This practice can provide useful data on the relative corrosion resistance of alternative alloys and coatings, but is not particularly useful with regard to deducing the various mechanisms responsible for these corrosion differences. Mechanistic experiments have traditionally been performed under controlled conditions in test chambers, but such controlled conditions are not necessarily representative of the complex mixtures of pollutants and meteorological conditions that occur in real atmospheres. The data analyzed in this paper were intended to provide mechanistic data for galvanized steel under semi-controlled field conditions at Research Triangle Park, NC, a site that would be considered clean in the context of much of the corrosion data in the literature. These experiments were intended to provide data that would allow surface chemistry and atmospheric processes to be considered separately.

Keywords: *Corrosion tests, *Atmospheric effects, *Air pollution effects(Materials), *Galvanized steel, *Deposition, Dry methods, Metals, Meteorology, Surface chemistry, Environmental effects, Runoff, Materials tests, Coatings, pH, Exposure, Experimental design.

PB93-120988/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Passive Sampling Device as a Simple Tool for Assessing Ecological Change: An Extended Monitoring Study in Ambient Air.
Harvard School of Public Health, Boston, MA. Dept. of Environmental Science and Physiology.
J. Mulik, J. Vams, P. Koutrakis, M. Wolfson, and D. Williams. 1992, 7p EPA/600/A-92/242

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.

Passive Sampling devices (PSDS) normally associated with personal monitoring were studied as less costly alternate or supplemental methods for the Environmental Monitoring and Assessment Program (EMAP). Annular denuder samplers (ADSs) were also evaluated during the study. The PSDs and ADSs were compared to the methods used at one of the remote sites in the National Dry Deposition Network (NDDN). At the 1991 EPA/A&WMA Symposium six months of comparison data was presented. These data showed that the PSDs and the ADSs could provide data that was within + or - 20 percent of the NDDN methods. For example, the Ozone-PSD was within + or - 10 percent of a real time uv ozone monitor. This inter-comparison of methods was extended for an entire year to determine the effect of seasonal temperature and humidity changes. The report specifically provides data from November 1990 to October 1991 at the NDDN site in Prince Edward, VA.

Keywords: *Air samplers, *Ecology, *Environmental monitoring, *Air pollution sampling, Cost analysis, Comparison, Performance evaluation, Substitutes, Concentration(Composition), *Environmental Monitoring and Assessment Program, *Passive sampling devices, *Annular denuder samplers, National Dry Deposition Network.

PB93-120996/REB PC A02/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Removal of CaCO3 Extender in Residential Coatings by Atmospheric Acidic Deposition.
North Carolina State Univ. at Raleigh.
W. C. Miller, R. E. Fornes, R. D. Gilbert, A. Speer, and J. Spence. 1992, 8p EPA/600/A-92/243
Grant EPA-R-814121
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The removal and fate of CaCO3 extender in latex and alkyd paints upon exposure of paint films to UV and atmospheric pollutants generated in a large environmental chamber were studied using optical and scanning electron microscopy in combination with energy dispersive spectroscopy. X-ray mapping of film cross sections was used to examine migration of calcium to the film surface, and x-ray diffraction and Energy Dispersive Spectroscopy (EDS) were employed to determine crystalline nature of surface deposits. Crystals of various forms of calcium sulfate formed on paint surfaces. Surprisingly, migration of calcium to the paint surface occurred in the absence of liquid water in the form of dew.

Keywords: *Air pollution effects(Materials), *Calcium carbonates, *Paints, *Physical radiation effects, *Ultraviolet radiation, Sampling, Exposure, Materials tests, Test chambers, Optical microscopy, Environmental effects, Scanning electron microscopy, X ray diffraction, Crystals, Surface properties, Energy dispersive spectroscopy.

PB93-121002/REB PC A02/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Atmospheric Mercury Measurements: Recent Observations in the Great Lakes Basin. Interim rept. 1 May 91-30 Apr 92.
Michigan Univ., Ann Arbor. Air Quality Lab.
M. Hoyer, G. Keeler, C. Lamborg, and A. Hoffman. 1992, 8p EPA/600/A-92/244
Contract EPA-T901758
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

In order to characterize ambient levels of vapor phase and particle mercury at source and receptor locations in the Great Lakes Basin, and to diagnose source regions of atmospheric mercury, samples were collected at three locations: Illinois Institute of Technology (ITT) in Chicago, IL and South Haven, MI (SHA) and aboard the R/V Laurentian (LAU). Vapor phase mercury samples were collected onto gold-coated sand traps and analyzed by cold vapor atomic fluorescence (CVAFS). Particulate phase mercury samples were collected onto both Teflon filters and prefired glass fiber filters. Teflon filters were analyzed by neutron activation analysis (NAA) and glass fiber filters were analyzed by CVAFS after acid digestion/extraction. Results of particle phase analysis from glass fiber filter samples and results of vapor phase mercury samples are presented here.

Keywords: *Mercury(Metal), *Great Lakes Basin, *Air pollution sampling, *Water pollution effects, *Air water interactions, *Deposition, Path of pollutants, Environmental transport, Fishes, Vapor phases, Fluorescence, Neutron activation analysis, Concentration(Composition), Particulates, Air pollution detection, Chemical analysis, Filters, Chicago(Illinois), South Haven(Michigan).

PB93-121010/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Evaluation of Portable X-ray Fluorescence Spectrometer for Measurement of Lead in Paint, Soil and Dust.
Research Triangle Inst., Research Triangle Park, NC.
D. L. Hardison, C. O. Whitaker, J. D. Neefus, E. D. Estes, and W. F. Gutnecht. 1992, 11p EPA/600/A-92/245
Contract EPA-68-02-4550
See also PB92-114180. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Three widely used commercially available portable X-ray fluorescence spectrometers were evaluated for precision and accuracy of measurement of lead in paint. Included were two direct reading instruments and one spectrum analyzer. Test materials were prepared by spiking oil-based and latex paint with white lead and casting the paint into films. The films were then placed on various substrates including wood, plasterboard, metal and concrete and the lead measured using the spectrometers that had been precalibrated by the manufacturers. The overall best results were generally attained with the wood and plasterboard substrates. Using the K shell X-rays, a typical linear range of 0.2 to 10.0 mg sq cm was found. Precisions achieved were 0.1-0.3 mg Pb/sq cm with the laboratory standards. At 1.0 mg Pb/sq cm, bias varied from about -0.4 to +0.3 mg Pb/sq cm. The L shell X-rays were shown to be attenuated by multiple layers of paint as is typically found in older dwellings.

Keywords: *Lead(Metal), *Paints, *X ray spectroscopy, *Fluorescence, Quality assurance, Precision, Accuracy, Standards, Quantitative analysis.

PB93-121028/REB PC A02/MF A01
Lake Michigan Urban Air Toxics Study: Design and Overview. Interim rept. Apr 91-Apr 92.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
G. F. Evans, A. J. Hoffman, and D. A. Pahl. Jun 92, 8p EPA/600/A-92/246

During the summer of 1991, an air toxics monitoring program was conducted in the lower Lake Michigan area. The study was designed to take advantage of the extensive meteorological and oxidant database being generated concurrently by the Lake Michigan Ozone Study (LMOS). Integrated 12-hour atmospheric samples were collected daily from July 8 through August 9, 1991 at three ground sites (two collocated with LMOS stations). Over 1,200 samples were analyzed to determine atmospheric levels of PCBs, pesticides, PAHs, VOCs, particle mass, and trace elements (including mercury). In addition, a research vessel and a small aircraft were employed on selected days to measure micrometeorological parameters, pollutant concentrations and some fluxes at offshore locations near Chicago. The major goals of the pilot study were to evaluate methods of sample collection and analysis, quantify the atmospheric concentrations of toxic substances in the lower Lake Michigan area, compare measurements made over land and over water, attempt to differentiate the Chicago urban plume from regional background, identify categories of sources for the target pollutants, and estimate deposition to the lake.

Keywords: *Air water interactions, *Water pollution, *Air pollution monitoring, *Deposition, *Toxic substances, Lake Michigan, Great Lakes, Trace elements, Urban areas, Particles, Volatile organic compounds, Aromatic polycyclic hydrocarbons, Meteorology, Concentration(Composition), Pollution sources, Polychlorinated biphenyls, Pesticides, Lake Michigan Ozone Study.

PB93-121036/REB PC A02/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Geographical Distribution and Source Type Analysis of Toxic Metal Emissions.
National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div.
W. G. Benjey, and D. H. Conventry. May 92, 10p EPA/600/A-92/247
Presented at the International Symposium on Measurement of Toxic and Related Air Pollutants, Durham, NC., May 3-8, 1992. See also PB89-164248, PB91-119669 and PB91-205021. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

An interim toxic emission inventory has been developed for the conterminous United States. Seven toxic metals found in lake and coastal waters are included: arsenic, cadmium, chromium, lead, mercury, nickel and selenium. The emissions are large relative to some estimates and demonstrate the importance of metal production in toxic metal emissions. In the absence of regional inventories dedicated to toxic emissions, there is a need for improvement of emission factors and speciation profiles for use with particulate emission inventories.

Keywords: *Air pollution, *Metals, *Geographical regions, *Pollution sources, Emission factors, Toxic substances, United States, Water pollution, Air water interactions, Lakes, Coastal regions, Regional analysis, Particulates, *Emission inventories, National Acid Pollution Assessment Program.

PB93-121044/REB PC A02/MF A01
Time-Course and Sensitivity of Muconic Acid as a Biomarker for Human Environmental Exposure to Benzene.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
T. J. Buckley, A. B. Lindstrom, V. R. Highsmith, W. E. Bechtold, and L. S. Sheldon. 1992, 8p EPA/600/A-92/248
Proceedings of the EPA/AWMA International Symposium: Measurement of Toxic and Related Air Pollutants, Durham, NC., May 3-8, 1992. Prepared in cooperation with Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM. Inhalation Toxicology Research Inst., and Research Triangle Inst., Research Triangle Park, NC.

Preliminary results are presented that show the effect of increased benzene exposure on the urinary elimination of trans,trans-muconic acid (MA) for an adult male. The results were generated from a controlled exposure experiment whereby an individual was exposed to benzene during a shower with gasoline-contaminated ground water. Based on measured air and water concentrations, it is estimated that the 25 minute shower and drying-off exposure period resulted in an inhalation and dermal absorbed dose of 122 micrograms and 19 micrograms, respectively, yielding an average dose rate of 334 micrograms/h during the shower period. The measured background dose rate of 1.2 micrograms/h was exceeded by a factor of 278 during the shower exposure. The average urinary MA elimination rate increased from 3.7 micrograms/h during the 30 h period before the exposure to 17.9 micrograms/h during the 22 h period after the exposure. The post-exposure profile of muconic acid elimination (micrograms/h) was characterized by two minor peaks (47 and 35 micrograms/h) occurring within 3 h and a major peak (61 micrograms/h) at approximately 11 h.

Keywords: *Benzene, *Biological markers, *Toxicology, *Environmental exposure, Chemical water pollutants, Humans, Dose-response relationships, Urine, *Muconic acids.

PB93-121051/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Evaluation of Commercially-Available Portable Gas Chromatographs.
IIT Research Inst., Chicago, IL.
R. Berkley, M. Miller, J. Chang, K. Oliver, and C. Fortune. 1992, 8p EPA/600/A-92/249
Contract EPA-68-D8-0002
See also PB88-211701. 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.

Six commercially-available portable gas chromatographs (PGC) were evaluated at a Superfund site during startup of bioremediation. Concentrations of volatile organic compounds (VOC) were slightly above ambient background levels. Concurrent colocated grab samples were collected periodically in Summa-polished canisters. They were analyzed by Method TO-14 using a mass-sensitive detector. The grab samples served as standards to assess the accuracy of data reported by the PGCs.

Keywords: *Chromatographic analysis, *Hazardous materials, Portable equipment, Evaluation, Sampling, Detectors, Standards, Accuracy, Sites, *Superfund.

PB93-121069/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Atmospheric Acidity Measurements during the Lake Michigan Urban Air Toxics Study. Interim rept. 1 May 91-30 Apr 92.
Michigan Univ., Ann Arbor. Air Quality Lab.
C. Lamborg, G. Keeler, and G. Evans. 1992, 8p EPA/600/A-92/250
Contract EPA-T901758
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

During the summer of 1991, as part of the Lake Michigan Urban Air Toxics Study, measurements of atmospheric reactive gases, fine fraction, and size fractionated acidic aerosol samples were taken at two sites (South Haven, MI and on the research vessel, Laurentian). The fine aerosol samples were collected using an annular denuder system (ADS) which allowed quantification of acidic and basic gases, as well as inorganic ions in the fine particle fraction (< 2.5 micrometers). The size fractionated data was obtained using a six stage micro-orifice impactor equipped with ammonia-scrubbing denuders. The ADS aerosol results showed extreme episodic behavior which correlated well with air mass transport from the southwest. The maximum concentrations observed in South Haven after over lake transport from the southwest were 241 nmol/cu m for aerosol strong acidity (H(+1)), and 3.8 ppb for nitric acid. These elevated acid levels were accompanied by hourly maximum O3 concentrations of 128 and 153 ppb, respectively. Levels at South Haven and aboard the Laurentian were very similar for most of the species measured. Size fractionated particulate mass results also compared well for most species, and showed a typical size dependent behavior. Measurements of aerosol acidity are also compared to those taken in Ann Arbor, MI during the one month study.

Keywords: *Acid rain, *Aerosols, *Air pollution monitoring, *Lake Michigan, Ozone, Nitric acid, Air pollution, Particle size distribution, Urban areas, Atmospheric circulation, Pollution transport, *Lake Michigan Urban Air Toxics Study.

PB93-121077/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Evaluation of a Sorbent-Based Preconcentrated for Analysis of VOCs in Air Using Gas Chromatography-Atomic Emission Detection. Rept. for Apr 91-Apr 92.
ManTech Environmental Technology, Inc., Research Triangle Park, NC.
K. D. Oliver, E. H. Daughtrey, and W. A. McClenny. 15 Apr 92, 8p EPA/600/A-92/251
Contract EPA-68-DO-0106
See also PB83-193524 and PB87-168688. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The work establishes design parameters for the use of carbon-based multisorbent tubes used as preconcentrators of volatile organic compounds when sampling ambient air. The multisorbents were tested in a two stage configuration with a primary tube for collection and a secondary tube for focusing of the VOCs collected in the primary tube. A system consisting of a Dynatherm ACEM 900 preconcentrator, Hewlett-Packard 5890 gas chromatograph and 5921A atomic emission detector was used to establish VOC trapping and release efficiency and the optimum purge gas volume to remove water from the primary tube. Results will be used to design an automated gas chromatograph to meet the VOC monitoring requirements of Title I and Title III of the CAAA of 1990.

Keywords: *Volatile organic compounds, *Air pollution, *Air samplers, Absorbers(Materials), Carbon, Gas chromatography, Design.

PB93-121085/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Development of an Analysis Method for Total Nonmethane Volatile Organic Carbon Emissions from Stationary Sources.
Radian Corp., Research Triangle Park, NC.
M. D. Jackson, J. E. Knoll, M. R. Midgett, S. C. Foster, and J. F. McGauhey. 1992, 8p EPA/600/A-92/252
Contract EPA-68-D1-0010
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The accurate measurement of the total nonmethane volatile organic carbon emissions from stationary sources is critical to characterizing of many industrial processes and for regulating according to the Clean Air Act. Current methods are difficult to use and the ability to do performance audits has been marginal, especially at low concentrations (50 parts per million of carbon, ppmc). One of the key elements for an ideal measurement technique would be a detector that responds to all classes of organic compounds equally, based on the number of carbon atoms present. A commercially available catalytic flame ionization detector (CFID) has shown promise in this area. Laboratory studies with a CFID were performed to determine the response of compounds with various functional groups. These classes included brominated, chlorinated, nitrogenated, oxygenated, aromatic, and nonaromatic compounds. The response of each compound is compared to the response of an alkane with the same number of carbon atoms. The paper will discuss this phase of the experimental work. Future work with the detector will incorporate an approach for sampling, sample recovery, and field tests for comparison to the EPA Method 25.

Keywords: *Air pollution detection, *Volatile organic compounds, *Carbon, Alkanes, Nitrogen organic compounds, Oxygen organic compounds, Bromine organic compounds, Chlorine organic compounds, Aromatic compounds, Detectors, Stationary sources, Air pollution, *Catalytic flame ionization detectors.

PB93-121093/REB PC **A01**/MF **A01**
Proceedings of the EPA/A and WMA International Symposium (1992), Measurement of Toxic and Related Air Pollutants. Held in Durham, North Carolina on May 4-9, 1992.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
B. W. Gay. 1992, 5p EPA/600/A-92/253
See also PB92-110386.

The 1992 USEPA/A&WMA International Symposium Measurement of Toxic and Related Air Pollutants was held in Durham, NC on May 4-9, 1992. This yearly symposium is sponsored by the Atmospheric Research and Exposure Assessment Laboratory and the Air & Waste Management Association. The technical program consisted of four days during which 200 papers were presented in twenty-three separate sessions. Individual sessions concentrated on recent advances in the measurement and monitoring of toxic and related air pollutants. Exhibitors from seventy instrument and consulting services were on display. 1992 was the 12th consecutive year AREAL has held the symposium and the 7th year in its co-sponsorship with the A&WMA. A majority of the papers presented at the symposium are contained in the proceedings.

Keywords: *Meetings, *Toxic substances, *Air pollution monitoring, US EPA, Pollution regulations, Implementation, Indoor air pollution, Pollution sources, Stationary sources, Mobile pollutant sources, Concentration(Composition), Air and Waste Management Association.

PB93-121101/REB PC **A02**/MF **A01**
Formaldehyde-Contaminated Fog Effects on Plant Growth. Symposium paper.
Corvallis Environmental Research Lab., OR.
J. R. Barker, and R. A. Shimabuku. 1992, 10p EPA/600/A-92/255
Pub. in Proceedings of Annual Meeting of the Air and Waste Management Association (85th) (AWMA), Paper No. 92-150.01, Jun 92. See also PB92-226506. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR.

Increasing attention is being given to atmospheric formaldehyde as actual and potential levels may increase. Atmospheric formaldehyde results from both natural processes and anthropogenic emissions. Natural processes include in situ formation through the photooxidation of volatile organic compounds (VOCs); releases from forest and grass fires; and biogenic emissions from bacteria and vegetation. Anthropogenic sources of atmospheric formaldehyde are numerous and include fuel combustion, garbage incineration, solvent use, electricity generation, among many others. The results of the fumigation study show that formaldehyde in fog water, at ambient concentrations currently reported in the SCAB (concentrations that, according to the literature, also likely occur in other regions of the United States), may inhibit the growth and reproductive potential of some plant species.

Keywords: *Plant growth, *Formaldehyde, *Fog, *Air pollution control, Water, Volatile organic compounds, Anthropogenic sources, Alcohol fuels, Combustion, Garbage, Incinerators, Grasses, Forest fires, Bacteria, Vegetation, Solvents, Electricity.

PB93-121119/REB PC **A03**/MF **A01**
Sustaining Soil Quality by Protecting the Soil Resource. Symposium paper.
Corvallis Environmental Research Lab., OR.
M. G. Johnson, D. A. Lammers, C. P. Andersen, P. T. Rygiewicz, and J. S. Kern. 1992, 12p EPA/600/A-92/257
Pub. in Proceedings of Soil Quality Standards, Symposium, San Antonio, TX., October 23, 1990, p72-80. See also PB88-113360. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR., and Pacific Northwest Forest and Range Experiment Station, Corvallis, OR. Forestry Sciences Lab.

People depend upon soils to meet a variety of societal and human needs such as the production of food and fiber. Soils also are important in the hydrologic cycle storing water for plant growth and purifying drinking water by percolation. Humans use soil to stabilize and store human wastes, reducing exposure to disease and other hazards. Even though soils are an important resource they are generally overlooked and their chronic loss and degradation goes unnoticed. Soil is continually being lost by wind and water erosion, or rendered unusable and unproductive by chemical and physical degradation. Rates of soil loss caused by human activities are greater than rates of replacement.

Keywords: *Protection, *Soil properties, *Meetings, Quality, Plant growth, Hydrologic cycle, Percolation, Exposure, Soil erosion, Abundance, Losses.

PB93-121127/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Multicomponent Aerosol Dynamic of the Pb-O2 System in a Bench Scale Flame Incinerator. Journal article Mar 89-Mar 90.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
W. Y. Lin, V. Sethi, and P. Biswas. c1992, 17p EPA/600/J-92/380
Contract EPA-68-03-4038
Pub. in Aerosol Science and Technology, v17 p119-133 1992. Sponsored by Environmental Protection

Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The article gives results of a study to understand the formation and growth of lead particles in a flame incinerator. A bench scale flame incinerator was used to perform controlled experiments with lead acetate as a test compound. A dilution probe (in conjunction with real-time aerosol instruments) was used to measure the evolution of the particle size distribution at different locations in the flame region. A multicomponent lognormal aerosol model was developed accounting for the chemistry of the lead-oxygen system, and for such aerosol dynamic phenomena as nucleation, coagulation, and condensation. Reasonable agreement was obtained between the predictions of the model using appropriate kinetic parameters and the experimental results.

Keywords: *Lead(Metal), *Incinerators, *Aerosols, *Air pollution, Oxygen, Mathematical models, Particle size distribution, Flames, Air pollution control, Kinematics, Lead inorganic compounds, Stationary sources, Reprints, *Flame incinerators.

PB93-121135/REB PC **A03**/MF **A01**
Characterization of 'Pseudomonas putida' Mutants Unable to Catabolize Benzoate: Cloning and Characterization of 'Pseudomonas' Genes Involved in Benzoate Catabolism and Isolation of a Chromosomal DNA Fragment Able to Substitute for xylS in Activation of the TOL Lower-Pathway Promoter. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
W. H. Jeffrey, S. M. Cuskey, P. J. Chapman, S. Resnick, and R. H. Olsen. 1992, 13p EPA/600/J-92/381
Pub. in Jnl. of Bacteriology, v174 n15 p4986-4996. Prepared in cooperation with Technical Resources, Inc., Gulf Breeze, FL., and Michigan Univ., Ann Arbor. Dept. of Microbiology and Immunology.

Previous work suggested that (benR) can substitute for the TOL plasmid-encoded xylS regulatory gene which promotes gene expression from the OP2 region of the lower pathway operon. Accordingly, structural and regulatory gene mutations were distinguished by the ability of benzoate-grown mutant strains to induce expression from OP2 without xylS using the TOL plasmid xylE gene (encoding catechol 2,3-dioxygenase) as reporter. A cloned 12 kb BamHI chromosomal DNA fragment from the P. aeruginosa PA01 chromosome complemented all mutations as shown by restoration of growth on benzoate minimal medium. Southern hybridizations demonstrated that DNA encoding the benzoate dioxygenase structural genes showed homology to DNA encoding toluate dioxygenase from the TOL plasmid pWWO, but benR did not show homology to xylS. Evolutionary relationships between regulatory systems of chromosomal and plasmid encoded genes for catabolism of benzoate and related compounds are suggested.

Keywords: *Pseudomonas putida, *Mutations, *Deoxyribonucleic acid, *Benzoic acid, *Promotor regions(Genetics), Molecular cloning, Bacterial chromosomes, Plasmids, Restriction mapping, Southern blotting, Nucleic acid sequence homology, Reprints, Benzote dioxygenases, Toluene dioxygenases.

PB93-121143/REB PC **A02**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Fate of 'Bacillus sphaericus' and 'Bacillus thuringiensis' Serovar 'Israelensis' in the Aquatic Environment. Journal article.
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Biology.
A. A. Yousten, F. J. Genthner, and E. F. Benfield. c1992, 8p EPA/600/J-92/382
Pub. in Jnl. of the American Mosquito Control Association, v8 n2 p143-148. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

Bacillus sphaericus spores were suspended in bottles of filtered (0.45 micrometers) freshwater and seawater under various conditions of temperature, pH and salinity. Heat resistant culturable counts (spores) slowly decreased with time. Spores suspended in dialysis bags submerged in a freshwater pond or in flowing seawater underwent a more rapid drop in heat resistant spore counts than did spores held in bottles. Thus, laboratory studies may overestimate spore longevity in the environment. Spore settling rate was related to the nature of particulate material in the water column. Paraspores (or perhaps spores and toxin) of B. thuringiensis serovar israelensis (B.t.i.) had a greater tendency to adhere to and settle with suspended sediment and fine particulates than did paraspores of B. sphaericus. These observations may at least partially explain the greater persistence of B. sphaericus larvicidal activity in field tests than that of B.t.i.

Keywords: *Bacillus thuringiens, *Aquatic microbiology, *Bacterial spores, Fresh water, Sea water, pH, Temperature, Salinity, Reprints, *Bacillus sphaericus.

PB93-121150/REB PC **A03**/MF **A01**
Use of Inoculation in Bioremediation. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
P. H. Pritchard. c1992, 14p EPA/600/J-92/383
Pub. in Current Opinion in Biotechnology, v3 p232-243 1992.

The potential for inoculating chemically-polluted sites with microorganisms to foster the removal or degradation of contaminating organic materials (and some inorganic materials) has been recognized. The purpose of this review is to address and discuss several important aspects that may help define problems associated with inoculation in bioremediation and to thereby provide an indication of the research needed to allow this process to become a meaningful and productive element of bioremediation technologies.

Keywords: *Biological treatment, *Remedial action, *Biodeterioration, *Hazardous materials, *Waste management, *Inoculation, Land pollution control, Performance evaluation, Microorganisms, Chemical compounds, Petroleum products, Soil contamination, Reprints, Cleanup operations.

PB93-121168/REB PC **A02**/MF **A01**
Effect of Inoculation on the Biodegradation of Weathered Prudhoe Bay Crude Oil. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
J. G. Mueller, S. M. Resnick, M. E. Shelton, and P. H. Pritchard. c1992, 10p EPA/600/J-92/384, CONTRIB-765
Pub. in Jnl. of Industrial Microbiology, v10 p95-102 1992. Prepared in cooperation with Technical Resources, Inc., Gulf Breeze, FL., and SBP Technologies, Inc., Atlanta, GA.

The grounding of the Exxon Valdez on March 24, 1989, resulted in the release of approx. 42 million liters of Prudhoe Bay crude oil into the waters of Prince William Sound, Alaska. Enrichment cultures from oil-contaminated beach material from Prince William Sound, Alaska, generated both a mixed bacterial community of indigenous, oil-degrading marine microorganisms and a pure culture oil-degrader, strain E12V. The mixed and axenic cultures were used in comparative shake flask studies of inoculation on biodegradation of Prudhoe Bay crude oil. Within 12 h following inoculation of homogenized, oiled beach material with the mixed culture, total CO2 production was increased 2-fold relative to a noninoculated control. Moreover, measurements of phenanthrene degradation (as determined by the release of 14CO2 from (9-14C)phenanthrene) showed a 2- or 3-fold greater degradation when inoculated with either strain E12V or with the mixed culture, respectively. However, as medium was replaced by a simulated tidal cycle, the observed stimulation of CO2 production decreased, and the addition of strain E12V had no greater effect on total CO2 production than the addition of inorganic nutrients alone. Chemical analysis of oil recovered after 7 days incubation also suggested that, while these cultures are capable of efficient biodegradation of Prudhoe Bay crude in liquid culture, inoculation of beach material with high numbers of these microorganisms had little effect on the rate and extent of biodegradation of weathered crude oil. Overall, the sustained stimulatory effect was no greater than that observed with the addition of inorganic nutrients alone.

Keywords: *Oil pollution, *Land pollution control, *Beaches, *Inoculation, *Biodeterioration, *Biological treatment, Prince William Sound, Alaska, Microorganisms, Prudhoe Bay, Environmental transport, Oil spills, Water pollution, Crude oil, Weathering, Reprints, *Exxon Valdez, Cleanup operations.

PB93-121176/REB PC **A02**/MF **A01**
National Science Foundation, Washington, DC.
Determination of Plasmid DNA Concentration Maintained by Nonculturable 'Escherichia coli' in Marine Microcosms. Journal article.
Center of Marine Biotechnology, Baltimore, MD.
J. J. Byrd, J. G. Leahy, and R. R. Colwell. c1992, 7p EPA/600/J-92/386
Grant NSF-BSR-8806509
Pub. in Applied and Environmental Microbiology, v58 n7 p2266-2270 Jul 92. Sponsored by National Science Foundation, Washington, DC., and Environmental Research Lab., Gulf Breeze, FL.

The concentration of plasmid pBR322 DNA in nonculturable Escherichia coli JM83 was measured to determine whether the plasmid concentration changed during survival of E. coli in marine and estuarine water. E. coli JM83 containing the plasmid pBR322 was placed in both sterile seawater and sterile estuarine water and analyzed for survival (i.e., culturability) and plasmid maintenance. The concentration of pBR322 DNA remained stable in E. coli JM83 for 28 days in an artificial seawater microcosm, even though nonculturability was achieved within 7 days. E. coli JM83 incubated in sterile natural seawater or sterile estuarine water did not reach nonculturability within 30 days. Under all three conditions, plasmid pBR322 DNA was maintained at approximately the initial concentration. Cloning of DNA into the plasmid pUC8 did not alter the ability of E. coli to maintain vector plasmid DNA, even when the culture was in the nonculturable state, but the concentration of plasmid DNA decreased with time in the microcosm. The authors conclude that E. coli is able to maintain plasmid DNA while in the nonculturable state and that the concentration at which the plasmid is maintained appears to be dependent upon the copy number of the plasmid and/or the presence of foreign DNA. (Copyright (c) 1992, American Society for Microbiology.)

Keywords: *Aquatic microbiology, *Escherichia coli, *Plasmids, *Deoxyribonucleic acids, *Marine biology, Cell survival, Molecular cloning, Sea water, Microbial colony count, Reprints.

PB93-121184/REB PC **A02**/MF **A01**
Office of Naval Research, Arlington, VA.
Dual Staining of Natural Bacterioplankton with 4',6-Diamidino-2Phenylindole and Fluorescent Oligonucleotide Probes Targeting Kingdom-Level 16S rRNA Sequencest. Journal article.
Minnesota Univ.-Duluth. Dept. of Biology.
R. E. Hicks, R. I. Amann, and D. A. Stahl. c1992, 8p EPA/600/J-92/386
Contract ONR-N00014-88-K-0093, Grant EPA-R-815285-01-02
Pub. in Applied and Environmental Microbiology, v58 n7 p2158-2163 Jul 92. Prepared in cooperation with Illinois Univ. at Urbana-Champaign, and Environmental Research Lab., Gulf Breeze, FL. Sponsored by Office of Naval Research, Arlington, VA., and Minnesota Sea Grant Inst., St. Paul.

A method for quantifying eubacterial cell densities in dilute communities of small bacterioplankton is presented. Cells in water samples were stained with 4', 6-diamidino-2-phenylindole (DAPI), transferred to gelatin-coated slides, and hybridized with rhodamine-labeled oligonucleotide probes specific for kingdom-level 16S rRNA sequences. Between 48 and 69% of the cells captured on membrane filters were transferred to gelatin-coated slides. The number of DAPI-stained cells that were visualized with eubacterial probes varied from 35 to 67%. Only 2 to 4% of these cells also fluoresced following hybridization with a probe designed to target a eukaryotic 16S rRNA sequence. Between 0.1 and 6% of the bacterioplankton in these samples were autofluorescent and may have been mistaken as cells that hybridized with fluorescent oligonucleotide probes. Dual staining allows precise estimates of the efficiency of transfers of cells to gelatin films and can be used to measure the percentage of the total bacterioplankton that also hybridize with fluorescent oligonucleotide probes, indicating specific phylogenetic groups.

Keywords: *16S ribosomal RNA, *Oligonucleotide probes, *Fluorescent dyes, Nucleic acid hybridization, Stains and staining, Phylogeny, Reprints, *Bacterioplankton, *Diamidino-2-phenylindole.

PB93-121192/REB PC **A02**/MF **A01**
Adenocarcinoma of the Retinal Pigment Epithelium in the Guppy 'Poecilia reticulata' Peters. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
J. W. Fournie, W. E. Hawkins, and W. W. Walker.
c1992, 9p EPA/600/J-92/387, CONTRIB-738
Pub. in Jnl. of Comparative Pathology, v106 p429-434 1992. Prepared in cooperation with Gulf Coast Research Lab., Ocean Springs, MS.

A single case of adenocarcinoma of the retinal pigment epithelium occurred in a guppy, Poecilia reticulata, Peters. This is the first such tumour reported from fishes. The left eye of the affected fish was severely exophthalmic because of a large intraocular tumour mass. The tumour, which displaced normal retina anteriorly, consisted mainly of melanin-containing epithelial cells. Neoplastic cells were bilayered and arranged in a tubular pattern. The tumour was confined to the orbit. Although the specimen was from a group exposed to a mixture of halogenated organic compounds, the lesion was not considered to have been chemically induced because of its rare occurrence within the group as a whole. (Copyright (c) 1992 Academic Press Limited.)

Keywords: *Adenocarcinoma, *Pigment epithelium of eye, *Eye neoplasms, Pathology, Cells(Biology), Reprints, *Poecilia reticulata.

PB93-121200/REB PC **A02**/MF **A01**
Application of DNA Probes to Analysis of Bacteriophage Distribution Patterns in the Environment.
Environmental Research Lab., Gulf Breeze, FL.
O. A. Ogunseitan, G. S. Sayler, and R. V. Miller. c1992, 9p EPA/600/J-92/388
Pub. in Application and Environment Microbiology, v58 n6 p2046-2052 Jun 92. Prepared in cooperation with Tennessee Univ., Knoxville, and Oklahoma State Univ., Stillwater.

Radiolabeled bacteriophage DNA probes have been used in the study to determine the distribution of Pseudomonas aeruginosa-infecting bacteriophages in natural samples of lake water, sediment, soil, and sewage. The sensitivity of detection of bacteriophage with the DNA probes was between 100 and 1,000 PFU and ten to the sixth power to ten to the seventh power CFU of lysogenized bacteria detectable with a homologous phage DNA probe. Analyses of environmental samples suggest that up to 40% of P. aeruginosa in natural ecosystems contain DNA sequences homologous to phage genomes. By using different bacteriophage DNA probes, the diversity of the bacteriophage population in sewage was estimated to be higher than that in other natural samples. The indication that transducing phages and prophages are widely distributed in the Pseudomonas populations investigated has considerable implications for the frequency of natural gene transfer by transduction and of lysogenic conversion of host bacteria in natural ecosystems. (Copyright (c) 1992, American Society for Microbiology.)

Keywords: *DNA probes, *Bacteriophages, *Aquatic microbiology, *Soil microbiology, Pseudomonas aeruginosa, Viral genes, Genetic transduction, Nucleic acid hybridization, Agar gel electrophoresis, Autoradiography, Reprints.

PB93-121218/REB PC **A02**/MF **A01**
UAF Radiorespirometric Protocol for Assessing Hydrocarbon Mineralization Potential in Environmental Samples. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
E. J. Brown, S. M. Resnick, C. Rebstock, H. V. Luong, and J. Lindstrom. c1992, 9p EPA/600/J-92/389
Pub. in Biodegradation, v2 p121-127 1991. Prepared in cooperation with Alaska Univ., Fairbanks. Inst. of Northern Engineering, and Technical Resources, Inc., Gulf Breeze, FL.

Following the EXXON Valdez oil spill, a radiorespirometric protocol was developed at the University of Alaska Fairbanks (UAF) to assess the potential for microorganisms in coastal waters and sediments to degrade hydrocarbons. The use of bioremediation to assist in oil spill cleanup operations required microbial bioassays to establish that addition of nitrogen and phosphorus would enhance biodegradation. A technique assessing 1-14C-n-hexadecane mineralization in seawater or nutrient rich sediment suspensions was used for both of these measurements. Hydrocarbon-degradation potentials were determined by measuring mineralization associated with sediment microorganisms in sediment suspended in sterilized seawater and/or marine Bushnell-Haas broth. Production of 14CO2 and CO2 was easily detectable during the first 48 hours with added hexadecane levels ranging from 10 to 500 mg/l of suspension and dependent on the biomass of hydrocarbon degraders, the hydrocarbon-oxidation potential of the biomass and nutrient availability. In addition to assessment of the hydrocarbon-degrading potential of environmental samples, the radiorespirometric procedure, and concomitant measurement of microbial biomass, has utility as an indicator of hydrocarbon contamination of soils, aqueous sediments and water, and can also be used to evaluate the effectiveness of bioremediation treatments. (Copyright (c) 1991 Kluwer Academic Publishers.)

Keywords: *Land pollution control, *Oil pollution, *Water pollution control, *Biodeterioration, *Remedial action, *Hydrocarbons, Oil spills, Crude oil, Microorganisms, Sediments, Mineralization, Beaches, Biomass, Nitrogen, Phosphorus, Carbon dioxide, Isotopic labeling, Performance evaluation, Reprints, *Exxon Valdez, *Radiorespirometry, Cleanup operations.

PB93-121226/REB PC **A03**/MF **A01**
Bioremediation as a Technology: Experiences with the Exxon Valdez Oil Spill.
Environmental Research Lab., Gulf Breeze, FL.
P. H. Pritchard. c1991, 18p EPA/600/J-92/390
Pub. in Jnl. of Hazardous Materials, v28 p115-130 1991. See also PB91-213819.

The results from the oil spill bioremediation project have demonstrated convincingly that fertilizers can be applied to oiled beaches to overcome nutrient limitations, thereby enhancing biodegradation of the oil. In Prince William Sound, the natural biodegradation rate of oil on the beaches was found to be quite high, primarily because of small concentrations of ammonia and phosphate in seawater that are introduced into the beach material with each tide. However, the addition of fertilizers was capable of increasing this biodegradation as much as two to three fold above background activity. In addition, the extent of enhanced degradation was such that beaches became visually cleaner and aesthetically improved. (Copyright (c) 1991 Elsevier Science Publishers B.V.)

Keywords: *Biological treatment, *Remedial action, *Oil pollution, *Land pollution control, *Beaches, Graphs(Charts), Biodeterioration, Prince William Sound, Environmental transport, Fertilizers, Water pollution control, Nutrients, Nitrogen, Phosphorous, Oil spills, Microbial degradation, Alaska, Reprints, *Exxon Valdez, Cleanup operations.

PB93-121234/REB PC **A02**/MF **A01**
Pneumatic Pumping Test for Soil Vacuum Extraction. Journal article.
Robert S. Kerr Environmental Research Lab., Ada, OK.
J. S. Cho, and D. C. DiGiulio. cAug 92, 9p EPA/600/J-92/391
Pub. in Environmental Progress, v11 n3 p228-233 Aug 92.

In-situ pneumatic pumping tests were performed to estimate the pneumatic permeability at a site containing soils contaminated with aviation gasoline. Determination of pneumatic permeability was necessary to evaluate soil-air discharge or pore volume exchange rates. Pressure propagation was measured in clustered vapor probes during the application of vacuum and positive pressure. An analytical solution for soil-air pressure distribution with a non-linear data fitting algorithm was adopted to obtain the pneumatic permeability from soil-air pressure distribution. Pneumatic pumping tests indicated substantially higher air discharge rates in the immediate vicinity of wells. The air discharge rate dissipated rapidly as distance from the wells increased. Application of increased vacuum or injection pressure resulted in substantially increased air flow in the immediate vicinity with small changes at a distance. This fact indicates that effective design should be based on air flow fields near wells, and the site specific design criteria should be determined with carefully conducted tests.

Keywords: *Soil treatment, *Remedial action, *Land pollution control, *Aviation fuels, *Pumps, Leakage, Underground storage, Soil contamination, Pneumatic tools, Performance evaluation, Storage tanks, In-situ processing, Permeability, Reprints, *Soil vacuum extraction.

PB93-121242/REB PC **A02**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Inhibition of Alkylbenzene Biodegradation under Denitrifying Conditions by Using Acetylene Block Technique. Journal article.
ManTech Environmental Technology, Inc., Ada, OK.
S. R. Hutchins. c1992, 6p EPA/600/J-92/393
Pub. in Applied and Environmental Microbiology, v58 n10 p3395-3398 Oct 92. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Aquifers contaminated with gasoline and other fuels often exhibit levels of benzene, toluene, ethylbenzene, and xylenes (BTEX) in excess of regulatory limits mandated by the U.S. Environmental Protection Agency. Addition of acetylene to microcosms simultaneously amended with nitrate and alkylbenzenes resulted in inhibition of the rate of alkylbenzene biodegradation under denitrifying conditions. Toluene, xylenes, and 1,2,4-trimethylbenzene were recalcitrant, whereas ethylbenzene was degraded at a slower rate than usual. Benzene was not degraded in either case. Addition of acetylene to microcosms preexposed to nitrate and alkylbenzenes produced similar inhibition. These data indicate that the activities of microorganisms that degrade alkylbenzenes under denitrifying conditions may be suppressed if the standard acetylene block technique is used to verify denitrifying activity.

Keywords: *Water pollution control, *Biodeterioration, *Aquifers, *Microbial degradation, *Oil pollution, Denitrification, Ground water, Acetylene, Microorganisms, Biological treatment, Performance evaluation, Fuels, Reprints, *Acetylene block technique.

PB93-121259/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Indoor (222)Rn in Tennessee Valley Houses: Seasonal, Building, and Geological Factors. Journal article Apr 91-Feb 92.
Oak Ridge National Lab., TN. Health and Safety Research Div.
C. S. Dudney, A. R. Hawthorne, D. L. Wilson, and R. B. Gammage. c1992, 10p EPA/600/J-92/396
Pub. in Indoor Air, v2 p32-39 1992. See also PB92-218395. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The article discusses effects of seasonal, building, and geological factors on indoor radon-222 (Rn-222) in 312 occupied Tennessee Valley houses. Two-season surveys of 226 houses in Roane County, TN, were conducted in 1985-86, and of 86 houses in Madison County, AL, in 1988-89. Alpha track detectors were placed in each house for 3 months or more during the winter heating season. Detectors were placed at the same sites during the following cooling season. Comparisons were made between winter and summer sampling times and between building types. For the data from Madison County, additional comparisons were made between regions of the county that differed in geological characteristics, especially the thickness of the overburden above the Chattanooga Shale layer, a geological stratum that has high concentrations of radon-226 and is widely found in the southeastern U.S. The geometric means of summer and winter measurements in Roane County were 33 and 54 Bq/cu m, respectively. For Madison County, the means were 121 and 88 Bq/cu m, respectively. The winter Rn-222 concentrations in Roane County exceeded summer concentrations. In Madison County, the opposite was found; atypically, concentrations were higher in the summer.

Keywords: *Radon, *Indoor air pollution, *Houses, *Air pollution monitoring, Alpha particle detectors, Summer, Winter, Seasonal variations, Geology, Air pollution control, Stationary sources, Shales, Reprints, Roane County(Tennessee), Madison County(Alabama).

PB93-121267/REB PC **A02**/MF **A01**
Corvallis Environmental Research Lab., OR.

Surface Waters Component of the Environmental Monitoring and Assessment Program (EMAP): An Overview. Journal article.
NSI Technology Services Corp., Corvallis, OR.
T. R. Whittier, and S. G. Paulsen. c1992, 10p EPA/600/J-92/397
Contract EPA-68-C8-0006
Pub. in Jnl. of Aquatic Ecosystem Health, v1 p119-126 1992. See also PB92-139948 and PB91-168518. Prepared in cooperation with Nevada Univ., Las Vegas. Environmental Research Center. Sponsored by Corvallis Environmental Research Lab., OR.

The U.S. EPA is developing a new monitoring program, the Environmental Monitoring and Assessment Program (EMAP), to monitor and assess the ecological health of major ecosystems, including surface waters, forests, near coastal, wetlands, agricultural, and arid lands, in an integrated systematic manner. EMAP is designed to operate at regional and national scales for decades and evaluate the extent and condition of entire ecological resources. EMAP has a common sampling framework for all resource types which consist of a systematic grid of about 12,500 points in the conterminous US which can be subdivided into subgrids of varying densities. Landscape characterization via remote imagery will be done on 40 sq km hexagons centered on these points. The 6% sample of the land surface will allow valid extrapolations to describe and quantify the extent of ecological resources.

Keywords: *Surface waters, *Water pollution, *Aquatic ecosystems, Monitoring, Surveys, Lakes, Coasts, Hydrology, Biological indicators, Fishes, Sediments, Ecology, Zooplankton, Invertebrates, Birds, Diatoms, Reprints, Wetlands, Environmental Monitoring and Assessment Program, Eutrophication.

PB93-121275/REB PC **A02/MF A01**
Corvallis Environmental Research Lab., OR.
Comparative Response of Nestling European Starlings and Red-Winged Blackbirds to an Oral Administration of Either Dimethoate or Chlorpyrifos. Journal article.
ManTech Environmental Technology, Inc., Corvallis, OR.
S. M. Meyers, B. T. Marden, R. S. Bennett, and R. Bentley. c1992, 9p EPA/600/J-92/398
Contract EPA-68-C8-80006
Pub. in Jnl. of Wildlife Diseases, v28 n3 p400-406 1992. Sponsored by Corvallis Environmental Research Lab., OR.

Red-winged blackbird (Agelaius phoeniceus: redwings) and European starling (Sturnus vulgaris: starling) nestlings were dosed with either 2.0 mg/kg body weight chlorpyrifos, 50.0 mg/kg body weight dimethoate, or a propylene glycol carrier in situ. The sensitivity to these compounds was compared between species and between adults and young of the same species. In addition, four growth measurements were recorded for nestlings to determine if these organophosphorus compounds caused perturbations in development at sublethal concentrations. Red-wing nestlings were more sensitive to chlorpyrifos than starling nestlings and starling nestlings were more sensitive to dimethoate than red-wing nestlings. In addition, red-wing nestling were more tolerant of a substantially higher concentration of dimethoate than the adult LD50. The sensitivity of starling nestlings to dimethoate was similar to adults. In contrast, both species were more sensitive to chlorpyrifos than adults. After the initial 24 hr, nestlings dosed with either chemical recovered and continued their development. Of the four growth measurements, body weight appeared to be the most important in documenting pesticide-induced growth inhibition.

Keywords: *Birds, *Pesticides, *Dursban, *Dimethoate, *Toxicity, Comparison, Body weight, Growth, Lethal dose 50, Reprints, Nestlings, Agelaius phoeniceus, Sturnus vulgaris.

PB93-121283/REB PC **A02/MF A01**
Corvallis Environmental Research Lab., OR.
Mechanisms of Episodic Acidification in Low-Order Streams in Maine, USA. Journal article.
National Park Service Cooperative Park Studies Unit, Knoxville, TN.
J. S. Kahl, S. A. Norton, T. A. Haines, E. A. Rochette, and R. H. Heath. c1992, 10p EPA/600/J-92/399
Prepared in cooperation with Maine Univ. at Orono, and Washington State Univ., Pullman. Dept. of Agronomy and Soils. Sponsored by Corvallis Environmental Research Lab., OR.

In addition to decreases in base cations associated with increased discharge, four other factors contribute to episodic depressions in pH and acid neutralizing capacity (ANC) in low-order streams in Maine: (1) increases in NO3 concentrations; (2) increases in organic acidity; (3) increases in anion fraction of SO4 concentrations; and (4) salt-effect generated acidity from soil solutions. In conjunction with increased discharge, factors 1, 2, or 4 appear necessary to depress pH to less than 5. The chemistry of individual precipitation events is irrelevant to the generation of acidic episodes, except those caused by high loading of neutral salts in coastal regions. Increases in discharge, but not necessarily in dilution of solutes, in combination with the chronically high SO4 from atmospheric deposition, provide the antecedent chemical conditions for episodic acidification. Differences in antecedent moisture conditions determine the processes that control output of either ANC or acidifying agents to aquatic systems.

Keywords: *Maine, *Streams, *Acidification, *Water pollution, Water chemistry, pH value, Surface waters, Air water interactions, Air pollution, Acid neutralizing capacity, Saline water-freshwater interfaces, Sulfur oxides, Nitrogen oxides, Coastal regions, Salt balance, Precipitation(Meteorology), Toxic substances, Soils, Deposition, Reprints, *Episodic depressions.

PB93-121291/REB PC **A02/MF A01**
Corvallis Environmental Research Lab., OR.
MAGIC Simulation of Surface Water Acidification at, and First Year Results from the Bear Brook Watershed Manipulation, Maine, USA. Journal article.
Maine Univ., Orono. Dept. of Geological Sciences.
S. A. Norton, R. F. Wright, and J. S. Kahl. c1992, 10p EPA/600/J-92/400
Pub. in Environmental Pollution, v77 p279-286 1992. Prepared in cooperation with Norsk Inst. for Vannforskning, Oslo. Sponsored by Corvallis Environmental Research Lab., OR.

The catchments of East and West Bear Brooks, Maine, USA, with similar stream chemistries and hydrographs, have been hydrologically and chemically monitored for 3.5 years. These clear water streams are low in ANC (0-70 microeg/litre), with variations caused by changing concentrations of base cations, SO4, NO3, and Cl. After one year of treatment, the response of the stream chemistry and the response modelled by MAGIC are similar. Episodes of high discharge in the treated catchment are not characterized by lower ANC and pH, and higher Al than prior to the manipulation. Concentrations of NO3 have increased about 10 microeg/litre during the dormant season, presumably due to additional nitrification of N and NH4. Discharge-chemistry relationships indicate that changes in stream chemistry, except for NO3, are dominated by ion exchange reactions in the upper part of the soil profile.

Keywords: *Acidification, *Watersheds, *Bear Brook, *Water pollution, Air water interactions, Experimental design, Maine, Surface waters, Water chemistry, Hydrology, Air pollution, Computerized simulation, Soil water, Ion exchanging, Acid neutralizing capacity, pH value, Nitrogen oxides, Sulfur oxides, Chlorine, Nitrification, Reprints, *MAGIC model, Model for Acidification of Groundwater in Catchments.

PB93-121309/REB PC **A02/MF A01**
Effect of Glyphosate and Nitrapyrin on Selected Bacterial Populations in Continuous-Flow Culture. Journal article.
Corvallis Environmental Research Lab., OR.
C. W. Hendricks, and A. N. Rhodes. c1992, 10p EPA/600/J-92/401
Pub. in Jnl. of Environmental Contamination and Toxicology, v49 p417-424 1992.

The study examines the effects of Roundup (N-(phosphonomethyl) glycine) and N-Serve (2-chloro-6-(trichloromethyl) pyridine) on the culture of soil organisms in a continuous-flow column system. In the study, nitrifying and various heterotrophic bacterial populations were enumerated over a 16-day period. The chemicals Roundup and N-Serve were added at day 8. Heterotrophic bacterial populations increased significantly in columns with 4.2 mg nitrapyrin and 68 mg glyphosate per g dry soil. Numbers of heterotrophs were not significantly different from controls in columns at lower chemical concentrations. Numbers of nitrifying bacteria did not appear to change following treatment, although nitrification was inhibited. Fluorescent antibody analysis of the nitrifying bacteria revealed that Nitrosolobus was more numerous than Nitrosospira and Nitrosomonas. Nitrosolobus increased in number, whereas the other two genera remained unchanged. In the study, the continuous-flow system proved to be both reliable and useful in the culture of nitrifying bacteria. The method is an alternative to traditional techniques for evaluation of the effects of chemicals on microbial biogeochemical cycles.

Keywords: *Nitrogen fixing bacteria, *Nitrogen fixation, *Soil microbiology, *Herbicides, *Soil bacteria, Fluorescent antibody technique, Reprints, *Continuous flow culture, *Glyphosphate, *Nitrapyrin, Cell enumeration, Nitrosolobus, Nitrosospira, Nitrosomonas.

PB93-121317/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Guides to Pollution Prevention: The Mechanical Equipment Repair Industry.
Battelle, Columbus, OH.
Sep 92, 50p EPA/625/R-92/008
Contract EPA-68-CO-0003
See also PB92-213206. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Commercial mechanical equipment repair services are covered under SIC 76 and include activities such as repair of boilers, commercial appliances, lawn mowers, refrigerators and air conditioners, electric motors, generators and transformers, among others. The guide describes the typical wastes generated during repairs, such as spent solvents, oils and rags, sand blasting materials, sump sludge, refrigerant, and scrap metals. Waste reduction options, including source reduction and recycling, are then identified. Suggestions for improved housekeeping, substitution of chlorinated solvent-based paints and degreasers with aqueous products, and recycling of solvents, refrigerants and scrap metal are some of the alternatives for waste reduction identified in the guide. To help repair shops determine opportunities for waste reduction at their own shops, the guide provides a set of worksheets which take the user step-by-step through an analysis of the on-site waste generating operations and the possibilities for minimizing each waste. The guide is also intended to be instructive to consultants who serve the industry and government agencies who regulate it.

Keywords: *Waste management, *Pollution abatement, *Repair shops, *Equipment, *Guidelines, Waste recycling, Environmental chemical substitutes, Substitutes, Degreasing, Waste storage, Materials recovery, *Waste minimization, Source reduction, SIC 76.

PB93-121325/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Guide for Conducting Treatability Studies under CERCLA: Thermal Desorption Quick Reference Fact Sheet.
Science Applications International Corp., Cincinnati, OH.
J. Rawe. Sep 92, 9p EPA/540/R-92/074B
Contract EPA-68-C8-0062
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Systematically conducted, well documented treatability studies are an important component of remedy evaluation and selection under the Superfund program. This fact sheet focuses on thermal desorption remedy selection treatability studies conducted in support of remedy selection that is conducted prior to the Record of Decision (ROD). This fact sheet presents a brief overview of how to design and implement a thermal desorption remedy screening treatability study. It also discusses the applicability of tiered treatability testing for evaluation of thermal desorption technologies.

Keywords: *Waste management, *Superfund, *Hazardous materials, Guidelines, Remedial action, Feasibility studies, Heat treatment, Desorption, Performance evaluation, Design criteria, Implementation, Organic compounds, *Office of Solid Waste and Emergency Response, Comprehensive Environmental Re-

sponse Compensation and Liability Act, Cleanup operations.

PB93-121333/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Selection of Control Technologies for Remediation of Lead Battery Recycling Sites. (Engineering Bulletin). Rept. for Jan 90-Oct 91.
Foster Wheeler Enviresponse, Inc., Edison, NJ.
M. D. Royer, A. Selvakumar, and R. Gaire. Sep 92, 20p
EPA/540/S-92/011
Contract EPA-68-C9-0033
See also PB92-114537. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The objective of this bulletin is to provide remedial project managers (RPMs), potentially responsible parties (PRPs), and their supporting contractors with information to facilitate the selection of treatment alternatives and cleanup services at lead battery recycling sites (LBRS). This bulletin condenses and updates the information presented in the EPA technical resource document (TRD) entitled, 'Selection of Control Technologies for Remediation of Lead Battery Recycling Sites,' PB92-114537, July 1991. This bulletin consolidates useful information on LBRS, such as the following: description of types of operations commonly conducted, and wastes generated at LBRS; technologies implemented or selected for LBRS remediation; case studies of treatability studies on LBRS wastes; past experience regarding the recyclability of materials that are found at LBRS; and profiles of potentially applicable innovative treatment technologies.

Keywords: *Superfund, *Remedial action, *Waste management, *Lead acid batteries, *Waste treatment, Waste recycling, Substitutes, Information transfer, Land pollution control, Stabilization, Water pollution control, Contractors, Technology utilization, Case studies, Solidification, Remedial project managers, Potentially responsible parties, Cleanup operations, Innovative treatment technologies, Soil washing.

PB93-121341/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Superfund Engineering Issue: Considerations for Evaluating the Impact of Metals Partitioning during the Incineration of Contaminated Soils from Superfund Sites.
Science Applications International Corp., Cincinnati, OH.
Sep 92, 17p EPA/540/S-92/014
Contract EPA/68-C8-0062
See also PB89-233423, PB90-132812 and PB90-186339. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A significant amount of research has been conducted on the incineration of contaminated materials. Although historically the primary focus has been on the destruction of organics, increased emphasis is being placed in the fate of metals. Unlike the organic portion, the metal fraction may change form but is not destroyed. Metals can remain with the ash when discharged from the primary combustion chamber. They can also volatilize or oxidize to form fumes or fine particulates and pass through the incineration system. Metal vapors, fumes, or particles can be collected by the APCDs, exit out the stack, or be deposited along the walls of the combustion chamber and remain in the incineration system. Potential pathways for metals are illustrated. This distribution of metals into the various incinerator system components is called 'partitioning.' A number of factors affect how various metals will partition, or behave, during incineration.

Keywords: *Superfund, *Incinerators, *Metals, *Soil treatment, *Waste management, Path of pollutants, Environmental transport, Air pollution control equipment, Soil contamination, Remedial action, Ashes, Hazardous materials, *Metal partitioning.

PB93-121812/REB PC **A10**/MF **A03**
Environmental Protection Agency, Seattle, WA. Region X.
Estuarine Habitat Assessment Protocol.
Battelle/Marine Sciences Lab., Sequim, WA.
C. A. Simenstad, C. D. Tanner, R. M. Thom, and L. L. Conquest. Sep 91, 205p EPA/910/9-91/037
Prepared in cooperation with Washington Univ., Seattle. Sponsored by Environmental Protection Agency, Seattle, WA. Region X.

Developed in response to the need for procedures that quantitatively assess the function of estuarine wetlands and associated nearshore habitats for fish and wildlife. Thus far, a systematic approach for measuring the function of estuarine wetlands and nearshore habitats that considers the factors has not been available. Consequently, restoration and creation of estuarine habitats have proceeded Haphazardly. Without such procedures, the scientific knowledge required to link the characteristics of estuarine habitats to their function in support of fish and wildlife will not emerge. The approach of the Protocol, and of the procedures and measurements it recommends, is intended to bridge the gap between estuarine habitat characteristics and the habitat's function to support fish and wildlife.

Keywords: *Estuaries, *Aquatic habitats, *Fish management, *Wildlife management, Habitat improvements, Wetlands, Marine environment, Marine biology, Aquatic ecosystems, Quality control, Sampling, Quality assurance, Ranking, *Estuarine, Habitat Assessment Protocol, Puget Sound Estuary Program.

PB93-121820/REB PC **A06**/MF **A02**
Environmental Protection Agency, Seattle, WA. Region X.
Toxic Contaminants in Puget Sound Wildlife: Literature Review and Recommendations for Research and Monitoring.
Cascadia Research Collective, Olympia, WA.
J. Calambokidis, J. B. Buchanan, G. H. Steiger, and J. R. Evenson. Sep 91, 109p EPA/910/9-91/023
Contract EPA-68-D8-0085
Sponsored by Environmental Protection Agency, Seattle, WA. Region X.

The role of contaminants in the causation of a variety of biological disorders observed in Puget Sound wildlife is not well understood. The report summarizes the current understanding and implications of toxic contaminants in Puget Sound wildlife and provides recommendations for future research and monitoring. A primary objective is to provide technical guidance on research and monitoring that, where possible, integrates a variety of approaches to identify contaminants and their impacts on wildlife. The guidance is designed to support local, state, and federal agencies that may conduct research or monitoring on wildlife in Puget Sound. The scope has been kept limited. Existing research is insufficient to adequately assess the impacts of contaminants on wildlife species in Puget Sound. Some of the data gaps involve the status and trends of wildlife populations and contaminant levels in wildlife that will require long-term monitoring.

Keywords: *Water pollution effects(Animals), *Puget Sound, *Wildlife, *Toxic substances, *Environmental monitoring, *Marine animals, Reviews, Recommendations, Research and development, Environmental effects, Long term effects, Birds, Biological effects, Toxicity, Sampling, Guidelines, Puget Sound Estuary Program.

PB93-122166/REB PC **A04**/MF **A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Exploring the Effects of Vector to Raster and Raster to Vector Conversion.
California Univ., Berkeley. Dept. of Forestry and Resources Management.
R. G. Congalton, and D. M. Schallert. Sep 92, 57p
EPA/600/R-92/166
Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

Spatial data can be represented in two formats: raster (grid cell) or vector (polygon). It is inevitable that conversion of the data between these two formats be essential to the best use of the data. Most geographic information systems (GIS) now provide software for such a conversion. The objective of the study was to evaluate the effects of data conversion on the accuracy of the resulting data layer. Simple shapes were chosen to document the results of the raster to vector and vector to raster conversion processes. These shapes included a square, a triangle (not aligned with the grid), a circle, a hole within the circle, and a nonconvex shape. Error matrices were employed to represent the changes in area through the conversion process. A second set of data including a circle, a thin rectangle, and a wide rectangle were used to examine the effects of grid cell size on both presence/absence of a feature as well as maintaining the feature's shape. Finally, recommendations for continuing the work and its application to information derived from remotely sensed data were presented.

Keywords: *Geographic information systems, *Data conversion, Computer graphics, Digital maps, Remote sensing, Polygons, Accuracy, Raster format, Vector format.

PB93-122174/REB PC **A04**/MF **A01**
Environmental Protection Agency, Washington, DC.
Trends in Nitrogen in the Chesapeake Bay, 1984-1990.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Jun 92, 61p* CBP/TRS-68/92
See also PB84-127729, PB89-152037 and PB90-226739. Sponsored by Environmental Protection Agency, Washington, DC.

The trend analysis presented in the document is based on data compiled through the Chesapeake Bay Water Quality Monitoring Program that was initiated in June 1984. In 1987, the Chesapeake Bay Agreement expanded and refined previous commitments of the signatories to reverse apparent declines in the quality and productivity of the Bay. The improvement and maintenance of water quality in the Bay were identified as the most critical elements in the goal to ensure the productivity of the Bay's living resources. To reach the goal, nitrogen and phosphorus loads entering the mainstem of the Bay were targeted to be reduced by 40% between the 1985 baseline year and the year 2000. Although most of the progress toward the targeted nutrient reduction goal has been achieved with respect to phosphorus, there have been some decreases in nitrogen inputs to the Bay from both point and nonpoint sources.

Keywords: *Nitrogen, *Environmental impacts, *Water pollution, *Chesapeake Bay, Trends, Reduction, Monitoring, Water quality, Runoff, Phytoplankton, Seasonal variations, Improvement, Maintenance, Nonpoint source.

PB93-122182/REB PC **A03**/MF **A01**
Chesapeake Bay Alosid, Blue Crab, Bluefish, and Weakfish/Spotted Seatrout Fishery Management Plans. Annual progress rept.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Dec 91, 40p CBP/APR-92/101
See also PB90-226754, PB92-186436 and PB92-186477.

Under the 1987 Chesapeake Bay Agreement, commercially, recreationally, and ecologically valuable finfish and shellfish species were selected for the development of baywide fishery management plans (FMPs). The following report is a review of the Alosid, Blue Crab, Bluefish, and Weakfish/Spotted Seatrout FMPs. The Alosid (American shad, Alosa sapidissima; hickory shad, Alosa mediocris; blueback herring, Alosa aestivalis; and alewife herring, Alosa pseudoharengus) and Blue Crab (Callinectes sapidus) Management Plans were adopted in July 1989 and reviewed in December 1990. The Bluefish (Pomatomus saltatrix) Management Plan and the Weakfish (Cynoscion regalis) and Spotted Seatrout (Cynoscion nebulosus) Management Plan were adopted in December 1990.

Keywords: *Management planning, *Fisheries, *Chesapeake Bay, Crabs, Herrings, Marine fishes, Trout, Populations, Monitoring, Abundance, Habitats, Alosid.

PB93-122190/REB PC **A05**/MF **A02**
Potential Intertidal Habitat Restoration Sites in the Duwamish River Estuary.
Environmental Protection Agency, Seattle, WA. Environmental Evaluations Branch.
C. D. Tanner. Dec 91, 99p EPA/910/9-91/050
Prepared in cooperation with Port of Seattle, WA. Engineering Dept.

Restoration of wetland habitats in highly urbanized areas is generally constrained by scarcity of opportunity, adverse impacts of surrounding land use, and cost. Although areal wetland losses approach 98% in Seat-

tie's Duwamish River estuary, the system continues to support important salmonid runs, as well as a variety of bird and mammal species. Estuarine-dependent organisms are likely limited by quality and quantity of intertidal habitat in the system. Because the long-range, estuary-wide benefit of site-specific mitigation and restoration projects is limited, it is imperative to develop estuary-wide restoration plans. Towards this end, an inventory and analysis of potential intertidal habitat restoration sites has been completed for the Duwamish River estuary. Twenty-four sites, ranging in size from 0.8 to 25 acres were identified and comparative functional potential assessed. The majority of these sites (18) occur in the upper estuary. Two sites are located in Elliott Bay, and four are located near the historic mouth of the river in the vicinity of Harbor Island. Spatial data have been developed in geographic information system (GIS) format. Other site-specific data relative to habitat restoration has also been assembled.

Keywords: *Habitat improvement, *Wetlands, *Estuaries, *Water pollution effects, *Coastal regions, Wildlife, Fishes, Urban areas, Duwamish River, Spatial distribution, Marine biology, Aquatic ecosystems, Trends.

PB93-122206/REB PC **A09**/MF **A02**
Environmental Protection Agency, Seattle, WA. Region X.
Evaluation of the Atmospheric Deposition of Toxic Contaminants to Puget Sound.
Puget Sound Water Quality Authority, Olympia, WA.
Aug 91, 190p EPA/910/9-91/027
Sponsored by Environmental Protection Agency, Seattle, WA. Region X.

A growing recognition of the potential for transfer of pollutants from air to water prompted the study of the contribution of airborne toxic contaminants to water quality problems in Puget Sound. The study objectives were: (1) to develop a better understanding of the relative contribution of atmospheric deposition to toxic contaminants in Commencement Bay and (2) to develop efficient and cost-effective tools which could be used for assessing the question in other Puget Sound reaches and embayments. Commencement Bay was selected to represent a 'worst case' test area in Puget Sound because it is heavily industrialized, having a complex mix of air pollution sources and high concentrations of chemicals in the bay sediments. The study design included sampling and analysis for metals, polycyclic aromatic hydrocarbons, PCBs, aliphatic hydrocarbons, and nutrients. Several mathematical models were created or modified for the study.

Keywords: *Puget Sound, *Deposition, *Air pollution, *Water pollution effects, *Toxic substances, Washington(State), Air water interactions, Water quality, Commencement Bay, Water pollution sampling, Meteorological data, Environmental transport, Mathematical models, Cost effectiveness, Nutrients, Water analysis, Industrial wastes, Metals, Aromatic polycyclic hydrocarbons, Polychlorinated biphenyls, Puget Sound Estuary Program.

PB93-122216/REB PC **A16**/MF **A03**
Environmental Protection Agency, Seattle, WA. Region X.
Evaluation of the Atmospheric Deposition of Toxic Contaminants to Puget Sound, Appendices.
Puget Sound Water Quality Authority, Olympia, WA.
Aug 91, 360p EPA/910/9-91/027-APP
Sponsored by Environmental Protection Agency, Seattle, WA. Region X.

The document contains the appendices for the report 'Evaluation of the Atmospheric Deposition of Toxic Contaminants to Puget Sound', (PB93-122206). Contents include Literature Survey; Meteorological Data; Laboratory Results - Six-Month Aerosol and Deposition Study; Emission Inventory; Laboratory Results--18-Day Receptor Modeling Field Study; Diffusion/Transport Modeling; Integration of Results; Supporting Documents.

Keywords: *Puget Sound, *Deposition, *Air pollution, *Water pollution effects, *Toxic substances, Water quality, Washington(State), Air water interactions, Aromatic polycyclic hydrocarbons, Water pollution sampling, Tables(Data), Meteorological data, Great Lakes, Environmental transport, Water analysis, Experimental design, Mathematical models, Polychlorinated biphenyls, Diffusion, Emission inventories, Puget Sound Estuary Program.

PB93-122224/REB PC **A05**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Technical Information Document for Residential Wood Combustion Best Available Control Measures. Final rept.
Radian Corp., Research Triangle Park, NC.
C. Stoneman, R. Pandullo, and D. L. Jones. Sep 92, 90p EPA/450/2-92/002
Contract EPA-68-D0-0125
See also PB90-130444. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The document provides technical information for developing residential wood combustion (RWC) best available control measureS (BACM) strategies in areas designated serious nonattainment for PM-10 (particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers) under the Clean Air Act (Act), as amended in 1990. States need the information to develop control strategies for serious PM-10 nonattainment area State implementation plans. The document recommends two types of measures: (1) integral measures (e.g., public education/awareness, wood burning curtailment) considered critical for the success of RWC control programs but not intended alone to ensure long-term attainment of PM-10 national ambient air quality standards (NAAQS); and (2) flexible measures (e.g., wood stove changeout, restrictions on new RWC devices) addressing new and existing RWC emissions and intended to provide for long-term attainment of PM-10 NAAQS. Issuance of the document fulfills EPA's obligation to issue RWC BACM guidance under section 190 of the amended Act.

Keywords: *Guidelines, *Air pollution control, *Residential buildings, *Combustion products, State government, Local government, Combustion efficiency, Performance evaluation.

PB93-122240/REB PC **A04**/MF **A01**
Environmental Pollution Control Alternatives: Reducing Water Pollution Control Costs in the Electroplating Industry. (Revised).
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
Sep 85, 71p EPA/625/5-85/016
See also PB83-171835 and PB84-184555.Color illustrations reproduced in black and white.

The publication is an update of a 1979 EPA publication: Environmental Pollution Control Alternatives: Economics of Wastewater Treatment Alternatives for the Electroplating Industry; NTIS publication number PB84-184555. It has been revised to reflect changes in technologies and prices and in the EPA regulations that directly affect costs in the electroplating industry. The publication contains information on the cost of treating such wastes by alternative technologies that were extant at the time of preparation in 1985. Moreover, the rising costs for treating such effluents over a prior 12-year period is shown. Technologies and approaches for implementing the technologies to reduce the costs of complying with EPA regulations are contained in the publication. Cost trade-offs are examined briefly. Lastly, materials recovery technologies, which result in decreased costs, are discussed briefly.

Keywords: *Water pollution economics, *Water pollution control, *Electroplating, *Economic analysis, *Industrial waste treatment, Substitutes, Cost analysis, Pollution regulations, Revisions, Capitalized costs, Rinsing, Operating costs, Materials recovery, Implementation, Performance evaluation, Sludge disposal, Chemical treatment, Drag-Out.

PB93-122257/REB PC **A09**/MF **A03**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Assessing Potential Indoor Air Impacts for Superfund Sites. Air/Superfund National Technical Guidance Study Series. Final rept.
Pacific Environmental Services, Inc., Herndon, VA.
W. Westbrook. Sep 92, 196p EPA/451/R-92/002
Contract EPA-68-D0-0124
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The manual for assessing indoor air impacts was developed to be used for buildings proximate to Superfund sites. The procedures and methods may also be applied to other assessments of hazardous wastes and hazardous materials. The purpose is to provide information on methods and techniques that can be used to assess the potential or actual impact a Superfund site may have on the indoor air quality of buildings proximate to the site in order that the risk to the occupants from this source may be estimated. The manual is designed to provide the tools needed to assist in the identification and resolution of indoor air quality concerns at Superfund site.

Keywords: *Superfund, *Indoor air pollution, *Air pollution monitoring, *Hazardous materials, *Environmental impact assessments, Waste disposal, Guidelines, Risk assessment, Health hazards, Occupational safety and health, Air quality, Procedures, Path of pollutants.

PB93-122265/REB PC **A15**/MF **A03**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Prescribed Burning Background Document and Technical Information Document for Prescribed Burning Best Available Control Measures. Final rept.
Pacific Environmental Services, Inc., Durham, NC.
A. Smith, C. Stoneman, K. Meardon, and M. Sink. Sep 92, 334p EPA-450/2-92/003
Contract EPA-68D00123
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The document provides technical information for developing prescribed burning (PB) best available control measures (BACM) strategies in areas designated serious nonattainment for PM-10 (particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers) under the Clean Air Act (Act), as amended in 1990. States need the information to develop control strategies for serious PM-10 nonattainment area State implementation plans (SIP's). The document also provides background information useful in determining PB reasonably available control measures for moderate PM-10 nonattainment area SIP's. The document recommends an eight-component smoke management program for PB BACM: smoke dispersion evaluation, burn planning, burner qualifications, public education/awareness, surveillance and enforcement, emission inventory, emission reduction techniques, and State oversight. The objective of smoke management is to allow burning when it will not jeopardize air quality and when techniques to minimize emissions are employed.

Keywords: *Best technology, *Air pollution control, *Particles, *Air pollution abatement, Inventories, Pollution regulations, Clean Air Act, State implementation plans, Smoke, Air quality, Natural resources management, Forests, Rand lands, Agriculture, Requirements, Public information, Law enforcement, Cost analysis, *Prescribed burning.

PB93-122273/REB PC **A09**/MF **A03**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures. Final rept.
Midwest Research Inst., Kansas City, MO.
R. Dunkins, and C. Cowherd. Sep 92, 196p EPA/450/2-92/004
Contract EPA-68-DO-0123
See also PB83-149617, PB83-258103 and PB89-103691. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The document provides technical information for developing fugitive dust (FD) best available control measures (BACM) strategies in areas designated serious nonattainment for PM-10 (particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers) under the Clean Air Act (Act), as amended in 1990. States need the information to develop control strategies for serious PM-10 nonattainment area State implementation plans (SIP's). The document also provides background information useful in determining FD reasonably available control measures for moderate PM-10 nonattainment area SIP's. The document recommends measures for FD BACM for six FD source categories: paved roads, unpaved roads, storage piles, construction/demolition activities, open area wind erosion, and agricultural tilling.

Keywords: *Dust, *Air pollution control, Regulations, Dust control, Risk, Project management, Pavements, Roads, Storage, Construction, Demolition, Cultivation, Agriculture, Wind erosion, Clean Air Act as amended in 1990, Particulates.

PB93-122281/REB PC **A03**/MF **A01**
Florida Dept. of Community Affairs, Tallahassee.
Recommended Performance Standard of the Florida Radon Research Program. Final rept. Apr 90-Sep 91.
Southern Research Inst., Birmingham, AL.
S. E. McDonough, and A. D. Williamson. Oct 92, 23p
SRI-ENV-90-785-6411, EPA/600/R-92/198
See also PB92-147909. Sponsored by Florida Dept. of Community Affairs, Tallahassee, and Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report is a revised version of a support document for the performance testing portion of the proposed Florida statewide building standard for radon-resistant construction. The support document was developed by the Alternate Performance Standard Development Committee of the Florida Radon Research Program (FRRP), commissioned by the Florida Department of Community Affairs. The report contains the rationale and technical justification for the version of the Performance Testing Section (Section 5) of the standard which was recommended by the Standard Development Committee, as well as recommended text for the section. The recommendations and draft standard language were based largely on an FRRP research project which involved study of short- and long-term average indoor radon concentrations in 80 Florida houses for over a year. At the time of the committee report the project had collected 6 months of data from about ha lf the houses and 3 months of data from the remaining half. After a brief review of the variability of indoor radon, the report describes background, methodology, data analysis strategy, and early results from the short-/long-term radon correlation project. These are followed by a rationale for the recommended standard section.

Keywords: *Radon, *Indoor air pollution, *Houses, *Building codes, *Florida, Air pollution control, Performance standards, Air pollution monitoring.

PB93-122299/REB PC **A07**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Radon Mitigation Studies: South Central Florida Demonstration. Final rept. Nov 87-Jan 91.
Southern Research Inst., Birmingham, AL.
C. S. Fowler, A. D. Williamson, B. E. Pyle, F. E. Belzer, and R. N. Coker. Oct 92, 144p SRI-ENV-91-44-6411-070, EPA/600/R-92/207
See also PB88-184908. Prepared in cooperation with Florida Dept. of Community Affairs, Tallahassee. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report gives results of an EPA radon mitigation project involving 14 slab-on-grade houses in Polk County, FL, having indoor radon levels of 320-3810 Bq/cu m (8.7-103 pCi/L), using sub-slab depressurization (SSD) in a variety of applications to evaluate optimal design criteria to be recommended as cost-effective and capable of reducing indoor radon concentrations in houses built over compacted soil fills. For all houses, obvious accessible radon entry points were sealed, and 53-90 L (12-20 gal.) suction pits were dug into the fill material. Two of the houses were mitigated with exterior horizontal suction holes drilled through the stem walls. In four houses, one or more suction pipes were in the garage. The remainder of the interior suction holes were in closets or some other unobtrusive location. Except for the two houses with exterior systems, the other 12 had mitigation fans in the attic. In-line centrifugal fans were used to mitigate each house, although a larger radial blower was installed overnight for experimental purposes in one house, and a vaccumcleaner was used to simulate a larger suction in another house for pressure field measurements only. Post-mitigation worst-case radon concentrations in these houses ranged from 40 to 290 Bq/cu m.

Keywords: *Radon, *Houses, *Air pollution control, *Indoor air pollution, Depressurization, Slabs, Fans, Earth fills, *Polk County(Florida), *Sub-slab depressurization.

PB93-122307/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Alternate VOC Control Technique Options for Small Rotogravure and Flexography Facilities. Final rept. Feb-Jun 92.
Research Triangle Inst., Research Triangle Park, NC.
D. A. Green, and C. M. Northeim. Oct 92, 46p EPA/600/R-92/201
Contract EPA-68-D1-0118
See also PB-292 490, PB80-157290, PB91-182006, PB91-168427 and PB91-219550. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report identifies Available Control Techniques (ACTs) for states to use as a reference when implementing Reasonable Available Control Technology (RACT) for graphic arts facilities that are covered by the Control Technologies Guidelines (CTGs), but emit less than 91 tonnes of volatile organic compounds (VOCs) per year. The CTGs for the graphic arts industry was published in December 1978. It defined RACT for VOCs emitted from publication and packaging rotogravure and from packaging flexography. Subsequent EPA guidance limited the applicability of RACT requirements to sources that emit 91 tonnes/yr or more of VOCs. The Clean Air Act Amendments of 1990 (CAAAs) now require RACT for VOC sources that emit as little as 9 tonnes/yr in extreme ozone nonattainment areas. Therefore, states are now required to establish and implement RACT for these smaller sources as well.

Keywords: *Air pollution control, *State implementation plans, *Volatile organic compounds, *Graphic arts, *Air pollution abatement, Flexography, Printing, Clean Air Act, Requirements, Stationary sources, Pollution sources, Cost analysis, Environmental chemical substitutes, *Reasonable Available Control Technology, Rotogravure, Small systems.

PB93-122315/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Babcock and Wilcox Cyclone Furnace Vitrification Technology: Applications Analysis Report.
Science Applications International Corp., Cincinnati, OH.
L. Staley. Aug 92, 50p EPA/540/AR-92/017
Contract EPA-68-CO-0048
See also PB92-222215 and PB92-222223. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The document is an evaluation of the performance of the Babcock & Wilcox (B&W) Cyclone Furnace Vitrification Technology and its applicability as a treatment technique for soils contaminated with heavy metals, radionuclides, and organics. Both the technical and economic aspects of the technology were examined. A demonstration of the B&W vitrification technology was conducted in the fall of 1991 using B&W's pilot-scale unit located at its Alliance Research Center in Alliance, Ohio. Operational data and sampling and analysis information were carefully compiled to establish a database against which other available data, as well as the vendor's claims for the technology, could be compared and evaluated. Conclusions concerning the technology's suitability for use in immobilizing metal and radionuclides in soils as well as destroying organic contaminants were reached. Extrapolations regarding applications to different contaminants and soil types were made.

Keywords: *Soil treatment, *Vitrification, *Hazardous materials, *Waste treatment, *Cyclone combustors, Heavy metals, Organic compounds, Radioisotopes, Economic analysis, Heat treatment, Immobilization, Combustion efficiency, Performance evaluation, Furnaces, Air pollution abatement, *Innovative treatment technologies.

PB93-122323/REB PC **A15**/MF **A03**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Proceedings of the Symposium on Soil Venting. Held in Houston, Texas on April 29-May 1, 1991.
Camp, Dresser and McKee, Inc., Cambridge, MA.
T. A. Pedersen, and C. Y. Fan. Oct 92, 345p EPA/600/R-92/174
Grant EPA-R-812808
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Soil venting has been used to remediate soils in the United States since the early 1980's. It is a recognized standard technology in Germany and is widely utilized in the Netherlands. While its application can sometimes be complex, the basic principle behind soil venting is simple. Air extraction or injection wells are used to create a pressure differential which causes air circulation through contaminated soils or consolidated geologic media. Soil venting is often preferable to above ground onsite and offsite treatment of soils because of lower cost. Venting involves the use of standard and readily obtainable commercial and industrial equipment. Capital expenditures and energy consumption are often far less than other remedial technologies such as thermal desorption. Another distinct advantage of venting is that air is introduced into soils which are often deficient in oxygen causing concomitant removal of VOCs and semivolatile organic compounds through biodegradation.

Keywords: *Meetings, *Remedial action, *Waste management, *Soil treatment, *Oil spills, Land pollution control, Soil contamination, Injection, Subsurface investigations, Physicochemical properties, Biodeterioration, Mathematical models, Site characterization, Field tests, Extraction, Performance evaluation, *Soil venting.

PB93-122331/REB PC **A99**/MF **A06**
Proceedings of the 1991 U.S. Environmental Protection Agency/Air and Waste Management Association International Symposium: Measurement of Toxic and Related Air Pollutants. Volume 1.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
R. K. M. Jayanty, and B. W. Gay. c1991, 601p EPA/600/R-92/206A
See also PB91-120279. Prepared in cooperation with Research Triangle Inst., Research Triangle Park, NC.

A joint conference for the sixth year co-sponsored by the Atmospheric Research and Exposure Assessment Laboratory (AREAL) of the U.S. Environmental Protection Agency and the Air and Waste Management Association was held in Durham, North Carolina, May 6-19, 1991. The technical program consisted of 220 presentations, held in 25 technical sessions, on recent advances in the measurement and monitoring of toxic and related pollutants found in ambient and source atmospheres. Covering a wide range of measurement topics and supported by 78 exhibitors of instrumentation and consulting services, the symposium was attended by almost a thousand professionals from the United States and other countries. The overview highlights a selection of the technical presentations. A synopsis of the keynote address to the symposium is also included. The volume contains sessions 1-14.

Keywords: *Meetings, *Air pollution, *Toxic substances, Russian, Ozone, Atmospheric chemistry, Concentration(Composition), Air pollution sampling, Aerosols, Particulates, United States, Indoor air pollution, Clouds(Meteorology), Asbestos, Air pollution effects(Humans), Urban areas, Dosimeters, Mobile pollutant sources, Volatile organic compounds, Nicotine, Fate of pollutants, Foreign technology.

PB93-122349/REB PC **A99**/MF **A06**
Proceedings of the 1991 U.S. Environmental Protection Agency/Air and Waste Management Association International Symposium: Measurement of Toxic and Related Air Pollutants. Volume 2.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
c1991, 620p EPA/600/R-92/206B
Prepared in cooperation with Air and Waste Management Association, Pittsburgh, PA.

A joint conference for the sixth year co-sponsored by the Atmospheric Research and Exposure Assessment Laboratory (AREAL) of the U.S. Environmental Protection Agency and the Air and Waste Management Association was held in Durham, North Carolina, May 6-19, 1991. The technical program consisted of 220 presentations, held in 25 technical sessions, on recent advances in the measurement and monitoring of toxic and related pollutants found in ambient and source atmospheres. Covering a wide range of measurement topics and supported by 78 exhibitors of instrumentation and consulting services, the symposium was attended by almost a thousand professionals from the

United States and other countries. The overview highlights a selection of the technical presentations. A synopsis of the keynote address to the symposium is alsoincluded. The volume contains sessions 15-25.

Keywords: *Meetings, *Air pollution, *Toxic substances, Volatile organic compounds, Air pollution sampling, Exposure, Air pollution effects(Humans), Remote sensing, Air samplers, Air pollution detection, Hazardous materials, Waste disposal, Data analysis, Pollution sources, Atmospheric diffusion, Mathematical models, Indoor air pollution.

PB93-122356/REB PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Guidance on the Adjusted Base Year Emissions Inventory and the 1996 Target for the 15 Percent Rate of Progress Plans.
Pechan (E.H.) and Associates, Inc., Springfield, VA.
E. H. Pechan. Oct 92, 62p EPA/452/R-92/005
See also PB91-216176 and PB92-118017. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

Section 182(b) (1) of the 1990 Clean Air Act Amendments (CAAA) requires all ozone nonattainment areas classified as moderate and above to submit a State implementation plan (SIP) revision by November 15, 1993, which describes, in part, how the areas will achieve an actual emissions reduction of at least 15 percent during the first 6 years after enactment of the CAAA (November 15, 1996). The portion of the SIP revision that illustrates the plan for the achievement of the emissions reduction is subsequently defined in the document as the 'rate of progress plan.' The document assists States in determining the 1996 Target Level of Emissions under the rate of progress plan requirement for moderate and above ozone nonattainment areas.

Keywords: *State implementation plans, *Ozone, *Air pollution, Requirements, Point sources, Volatile organic compounds, Clean Air Act, Specifications, Revisions, Emission inventories.

PB93-122364/REB PC **A03**/MF **A01**
State Air Pollution Control Programs: A Profile Report.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
W. F. Hamilton. Oct 92, 25p EPA/452/R-92/006

The report provides information which States can use to compare certain elements of their Air Pollution Control Programs to those of other States. Program elements included in the report are enforcement, monitoring, administration, permitting/new source review, regulatory planning and development, and control of air toxics.

Keywords: *Air pollution control, *State programs, *Information transfer, Comparison, Law enforcement, Pollution regulations, Air pollution monitoring, Administrative procedures, Permits, Toxic substances, Reviews.

PB93-122380/REB PC **A99**/MF **A06**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
User's Guide for the Urban Airshed Model. Volume 4. User's Manual for the Emissions Preprocessor System 2.0. Part A: Core FORTRAN System. Part B: Interface and Emission Display System.
Systems Applications International, San Rafael, CA.
M. Causley, G. Wilson, M. Jimenez, L. A. Gardner, and A. Noda. 30 Jun 92, 705p EPA/450/4-90/007D
Contracts EPA-68D00124, EPA-68D9066
Supersedes PB92-226232. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

Volume 4 Part A serves as a manual for the upgraded Emissions Preprocessor System (EPS 2.0). EPS 2.0 produces low-level gridded, chemically speciated, temporally allocated anthropogenic and natural emission inputs for the Urban Airshed Model (UAM). It also produces inputs to the UAM point source preprocessor. EPS 2.0 may be used to process link-based emissions, adjust emissions levels to reflect the effects of anticipated growth or the implementation of proposed controls, and summarize emissions totals by various categorizations for quality control purposes. Part B serves as a manual for the Emissions Preprocessor System (EPS 2.0) Interface and Emission Display System. The Interface and Emission Display System comprises two independent programs that allow EPS 2.0 users to (1) create or modify many of the input files necessary to run the EPS 2.0 core modules; and (2) produce statistical tables and graphics of emissions data for analysis. The Interface is a user-friendly menu system written in SAS language.

Keywords: *User manuals(Computer programs), *Air pollution, Ozone, Photochemical reactions, Pollution sources, Fortran, Temporal distribution, Natural emissions, Quality control, Statistical analysis, Tables(Data), Graphs(Charts), *Urban Airshed Mode, *Emission Preprocessor System, *Interface and Emission Display System.

PB93-122398/REB PC **A03**/MF **A01**
Environmental Monitoring and Assessment Program: Gulf Coast Salt Marsh Pilot Study.
Corvallis Environmental Research Lab., OR.
L. Squires. Nov 92, 34p EPA/600/R-92/216
Contract EPA-68-C8-0006
See also PB91-149526 and PB91-168500. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC.

The Environmental Monitoring and Assessment Program (EMAP) was initiated by the U.S. Environmental Protection Agency (EPA) to monitor the condition of the Nation's natural resources. The Wetlands component of EMAP is designed to quantitatively assess the current status and long-term trends in wetland condition at regional and national scales. In the short-term, EMAP-Wetlands will provide standarized protocols for measuring and describing wetland condition, report on estimates of wetland condition in selected regions of the country, and develop standardized formats for reporting results. EMAP-Wetlands is being implemented by wetland class and geographic regions in three phases. Pilot studies are being conducted in small geographic regions (e.g., states) during the first phase to evaluate the ability of potential indicators to meet certain selection criteria. These studies will be followed by demonstration studies that evaluate the performance of indicators on larger scales (e.g., Gulf Coast region). Indicators that successfully meet critical criteria will be implemented regionally and nationally to assess wetland condition.

Keywords: *Environmental monitoring, *Environmental impact assessments, *Salt marshes, *Water pollution sampling, *Biological indicators, Gulf stream, Natural resources, Wetlands, Long term effects, Regional analysis, Experimental design, Field tests, Ecology, Sampling, Training, Site surveys, Water quality, *Environmental Monitoring and Assessment Program.

PB93-122406/REB PC **A09**/MF **A02**
Army Medical Research and Development Command, Fort Detrick, MD.
Drinking Water Toxicity Profiles. Final rept.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
M. L. Daugherty, R. A. Faust, A. A. Francis, K. L. Khanna, and P. Y. L. Lu. Sep 92, 188p
See also PB84-211135. Sponsored by Army Medical Research and Development Command, Fort Detrick, MD.

Drinking Water Toxicological Profiles are short summaries of selected mammalian health effects literature. They are not intended to be comprehensive literature reviews. The profiles are used by the U.S. EPA Office of Water to determine if a database is sufficient to allow the development of Drinking Water Health Advisories. The report contains profiles for 25 chemicals; Copper naphthenate; Dichlorophene; Diethylenetriamine; Ethyl centralite; Ethyleneglycol monoethyl ether; Hydrazine; N-Nitrosodiphenylamine; p-Nitrophenol; Pentaerythritol tetranitrate (PETN); Triethylene glycol dinitrate (TEGDN); Vat yellow 4; Zinc napthanate; Dibenzofuran; Di-n-octyl phthalate; Dioctyl adipate; 2,4,6-Tribromophenol; 2-Fluorobiphenyl; Terphenyl (D-14); 4-Bromofluorobenzene; Ethylene glycol dinitrate (EGDN); Resorcinol; Chlorosulfonic acid; Titanium tetrachloride; Dipropylene glycol 1,3-dinitrate; Dipropylene glycol 1,2-dinitrate.

Keywords: *Potable water, *Toxicity, *Chemical water pollutants, Tables(Data), Pharmacokinetics, Environmental exposure pathways, Chemical properties, Animals, Humans.

PB93-122422/REB PC **A07**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Control Technology Center.
User's Manual for the BLIS BBS.
VIGYAN, Inc., Falls Church, VA.
Sep 92, 130p EPA/453/B-92/012
Contract EPA-68-D0-0177
See also PB91-234583, PB89-108237 and PB92-235647. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Control Technology Center.

The document summarizes the functions of the RACT/BACT/LAER Clearinghouse Information System (BLIS) bulletin board system currently located in the OAQPS Technology Transfer Network (OAQPS TTN). The manual includes information on how to conduct a search of the BLIS database, how to view the data, and how to download data to the users computer.

Keywords: *User manuals, *Information systems, *Air pollution control, Best technology, Information services, Clean Air Act, Data processing, Data base management, Search structuring, Information retrieval effectiveness, Data retrieval, *BLIS system, *Bulletin Board System, Lowest Available Emission Rate, Reasonable Available Control Technology, Best Available Control Technology.

PB93-122430/REB PC **A03**/MF **A01**
Information Technology Architecture.
Environmental Protection Agency, Research Triangle Park, NC. Architectural Management and Planning Branch.
T. Harris. 30 Nov 91, 41p EPA/208/R-92/001

Information Technology Architecture provides a summary of the Environmental Protection Agency's (EPA's) current information technology architecture, its underlying principles, and its future enhancement efforts. The diagrams and text form an overall picture on the Agency's information technology architecture and represent the decisions of IRM management. In addition to presenting the current architecture, the document reflects decisions and standards that are in the implementation process. Individuals involved in planning, implementing, and using the Agency's information resources will receive the greatest benefit from reviewing the document.

Keywords: *US EPA, *Information systems, *Computer architecture, *Computer networks, Data base management, Local area networks, Software tools, Management planning, Workstations, UNIX(Operating system), Acquisition, Printers(Data processing), Relational data bases, Query languages, Computer systems hardware, Communication networks, Teleconferencing, Geographic information systems.

PB93-122448/REB PC **A04**/MF **A01**
Calciners and Dryers in Mineral Industries: Background Information for Promulgated Standards.
Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Dec 91, 66p EPA/450/3-85/025B
See also PB86-196904.

Standards of performance for the control of emissions from calciners and dryers in mineral industries are being promulgated under the authority of Section 111 of the Clean Air Act. These standards would apply to new, modified, or reconstructed calciners and dryers in 17 mineral industries. This document contains a summary of the contents on the proposed standards, the Agency's response to the comments, and a summary of the changes to the standards since proposal.

Keywords: *New source performance standards, *Roasters, *Drying apparatus, *Mineral industry, *Air pollution standards, Performance standards, Clean Air Act, Public opinion, Pollution regulations, Revisions, Air pollution control, Air pollution abatement.

PB93-122455/REB PC **A04**/MF **A01**
Enabling Document for New Source Performance Standards for Calciners and Dryers in Mineral Industries. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards. Dec 91, 61p EPA/450/3-85/028

Standards of performance for the control of emissions from calciners and dryers in mineral industries have been promulgated under the authority of Section 111 of the Clean Air Act. These standards would apply to new, modified, or reconstructed calciners and dryers in 17 mineral industries. This document contains a summary of the standards, requirements of the general provisions (under Subpart A, 40 CFR Part 60), a summary process description for 17 industries, and other information pertaining to the implementation of these standards.

Keywords: *New source performance standards, *Mineral industry, *Drying apparatus, *Roasters, *Air pollution standards, Law enforcement, Pollution regulations, Standards compliance, Performance standards, Air pollution sampling, Process charting, Flow charting, Air pollution control, Equipment, Requirements.

PB93-123016/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Sheet Metal Components. Environmental research brief.
Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
H. W. Edwards, M. F. Kostrzewa, and G. P. Looby. Sep 92, 6p EPA/600/S-92/035
Grant EPA-R-814903
See also PB92-196377. Prepared in cooperation with University City Science Center, Philadelphia, PA. 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 waste but who lack the expertise to do so. In an effort to assist these manufacturers 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 performed an assessment at a plant that manufactures precision sheet-metal components, primarily for electronics and medical equipment. Sheet metal is machined into desired components that are anodized or chromated if aluminum; degreased and painted if required; and assembled, inspected, packaged, and shipped. The team's report, detailing findings and recommendations, indicated that the plant could achieve significant cost savings and waste reduction by replacing its standard paint spray guns with high-volume low-pressure paint guns, thereby reducing paint overspray.

Keywords: *Hazardous materials, *Waste management, *Metal sheets, Pollution abatement, Manufacturing, Assessments, Electronic equipment, Medical equipment, Painting, Degreasing, Anodizing, Protective coatings, Chromates, *Waste minimization, *Source reduction, SIC 20-39.

PB93-123024/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Custom Molded Plastic Products. Environmental research brief.
Tennessee Univ., Knoxville. Dept. of Engineering Science and Mechanics.
R. J. Jendrucko, and P. S. Miller. Sep 92, 6p EPA/600/S-92/034
Grant EPA-R-814903
Prepared in cooperation with University City Science Center, Philadelphia, PA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The WMAC team at the University of Tennessee performed an assessment at a plant manufacturing custom-molded structural foam plastic products -- approximately 840,000 parts per year. Resin pellets are blended with colorant pellets and regrind, then processed through a mold and press machine. Unfinished products are degated to remove seams, have attachments inserted, and are drilled, if necessary. Next, parts are patched and sanded. Finally, the part undergoes finishing operations including nickel coating, spray fill application, and top coat application. The team's report, detailing findings and recommendations, indicated that the majority of waste was generated in the mold and press machines but that the greatest savings could be obtained by utilizing electrostatic spray equipment in the finishing department to reduce (by 28%) the amount of paint solids waste generated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Plastics, *Molding techniques, Foam, Manufacturing, Coatings, Finishing, Painting, *Waste minimization, Source reduction, SIC 20-39.

PB93-123032/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Injection-Molded Car and Truck Mirrors. Environmental research brief.
Louisville Univ., KY. Dept. of Chemical Engineering.
M. Fleischman, C. Hensen, G. P. Looby, and F. W. Kirsch. Sep 92, 6p EPA/600/S-92/032
Grant EPA-R-814903
Prepared in cooperation with University City Science Center, Philadelphia, PA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The WMAC team at the University of Louisville performed an assessment at a plant that manufactures injection - molded car and truck mirrors -- over 2.5 million/yr. Purchased parts and injection-molded plastic parts manufactured onsite are painted as needed and assembled. The team's report, detailing findings and recommendations, indicated that a large quantity of waste is generated by the painting process and that waste plastic also is generated in significant amounts. The greatest cost savings can be achieved in the plant by using an alternate method of disposing of the waste paint sludge generated in the paint booths.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Plastics, *Injection molding, Manufacturing, Cost analysis, Painting, Sludge disposal, Mirrors, Motor vehicles, *Waste minimization, Source reduction, SIC 20-39.

PB93-123040/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Machined Parts. Environmental research brief.
Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
H. W. Edwards, M. F. Kostrzewa, P. S. Miller, and G. P. Looby. Sep 92, 6p EPA/600/S-92/031
Grant EPA-R-814903
Prepared in cooperation with University City Science Center, Philadelphia, PA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The WMAC team at Colorado State University performed an assessment at a plant manufacturing machined parts -- approximately 500,000 units/yr. The facility performs precision machine-shop work on a job shop basis. The process begins with cutting the stock to size, machining and hand deburring the parts. Next, the parts are machine deburred in a large tumbler washed, degreased, shipped offsite for chromating, and returned, assembled, inspected packaged, and shipped. The team's report, detailing findings and recommendations indicated that the majority of waste was generated by the deburrer rinse but that the greatest savings could be obtained by replacing the cutting fluid concentrate, thereby eliminating the need for degreasing with 1,1,1-trichloroethane.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Machine parts, Manufacturing, Degreasing, Cutting, Casting, Deburring, Rinsing, Waste water, *Waste minimization, Source reduction, SIC 20-39.

PB93-123057/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Finished Metal Components. Environmental research brief.
Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
H. W. Edwards, M. F. Kostrzewa, F. W. Kirsch, and J. C. Maginn. Sep 92, 6p EPA/600/S-92/030
Grant EPA-R-814903
Prepared in cooperation with University City Science Center, Philadelphia, PA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The WMAC team at Colorado State University performed an assessment at a plant manufacturing finished metal components -- approximately 260,000 sq ft/yr. Customer-specified coatings and surface treatments are applied to prefabricated aluminum and stainless steel parts. Aluminum parts may be finished by hard-coat or soft-coat anodizing, and chromate conversion coating. Stainless steel parts are finished by surface passivation. Parts are also processed for surface inspection using a fluorescent dye and ultraviolet light. The team's report, detailing findings and recommendations, indicated that most waste was generated in the aluminum anodizing process, and that the greatest savings could be obtained by using hot deionized water instead of nickel acetate solution to seal pores in the aluminum oxide coating applied by anodizing.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Metal finishing, *Components, Coatings, Surface treatments, Manufacturing, Inspection, Sealing, Anodization, *Waste minimization, Source reduction, SIC 20-39.

PB93-123065/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Cutting and Welding Equipment. Environmental research brief.
Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
H. W. Edwards, M. F. Kostrzewa, and G. P. Looby. Sep 92, 7p EPA/600/S-92/029
Grant EPA-R-814903
Prepared in cooperation with University City Science Center, Philadelphia, PA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The WMAC team at Colorado State University performed an assessment at a plant that produces custom-built cutting and welding equipment. Components are fabricated from steel and other raw materials that are cleaned, machined, welded, and painted. Machines are then assembled, tested, and calibrated. The hazardous wastes generated by the plant include tramp oil, spent cutting fluid, spent lacquer thinner, and chromium-contaminated paint dust and filters. The team's report, detailing findings and recommendations, indicated that the plant could achieve the greatest dollar savings by replacing chromium-containing solvent-based paints with chromium-free water-based paints.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Welders, *Cutting machines, Manufacturing, Cleaning, Machining, Welding, Painting, Environmental chemical substitutes, *Waste minimization, Source reduction, SIC 20-39.

PB93-123073/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Industrial Coatings. Environmental research brief.
Louisville Univ., KY. Dept. of Chemical Engineering.
M. Fleischman, D. J. Collins, F. W. Kirsch, and J. C. Maginn. Sep 92, 7p EPA/600/S-92/028
Grant EPA-R-814903
Prepared in cooperation with University City Science Center, Philadelphia, PA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The WMAC team at the University of Louisville performed an assessment at a plant manufacturing industrial coatings -- approximately 2,700,000 gal/yr. The products are diversified, being made in batches of

varying size to meet customer specifications. Pigments are milled as needed, and batches are prepared by controlled mixing of solvents, resins, pigments or dyes, and additives. The products are packaged in small containers, drums or tanker trucks, or held in bulk storage tanks. The team's report, detailing findings and recommendations, indicated that most waste occurred as solvent loss by evaporation and as residual solvent in emptied containers, and that the greatest savings could be obtained by fitting batch tanks with covers and submerged-filling tubes to reduce vapor losses and storing solvent drums on an incline to reduce residual solvent remaining in drums.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Coatings, Manufacturing, Pigments, Solvents, Additives, Tanks(Containers), Air pollution, *Waste minimization, Source reduction, SIC 20-39.

PB93-123081/REB PC **A04**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Use of Expert System in a Water Utility. Final rept. Jun 88-Jun 91.
North Penn Water Authority, Lansdale, PA.
R. M. Males, W. M. Grayman, B. Hertz, H. Borchers, and D. Milan. Nov 92, 75p EPA/600/R-92/218
Prepared in cooperation with RMM Technical Services, Inc., Cincinnati, OH. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A three-year cooperative agreement between the North Penn Water Authority (NPWA), Lansdale, Pennsylvania, and the US EPA Drinking Water Research Division, Concinnati, Ohio, to study use of expert systems technology in a water utility, has resulted in the development of two expert systems that demonstrate basic principles that should be broadly applicable to other water utilities. A 'customer query expert system' assists non-technical users in handling customer questions relating to water quality. A 'pump efficiency watcher' expert system is designed to flag long-term changes in well pump performance, and to calculate a number of pump performance parameters of interest. The results clearly demonstrate that expert systems that are potentially useful to water utilities can be developed at moderate cost. Significant effort, however, should be expected to move from prototype 'proof of concept' expert system demonstrations, to fully-featured, field-usable products.

Keywords: *Water services, *Public utilities, *Expert systems, Potable water, Water quality, Pumps, Efficiency, Trends, Long range planning, Ground water, Computer applications.

PB93-123099/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Silicon-Controlled Rectifiers and Schottky Rectifiers. Environmental research brief.
Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
H. W. Edwards, M. Kostrzewa, P. S. Miller, and G. P. Looby. Sep 92, 6p EPA/600/S-92/036
Grant EPA-R-814903
Prepared in cooperation with University City Science Center, Philadelphia, PA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The WMAC team at Colorado State University performed an assessment at a plant manufacturing devices for converting alternating current into direct current (silicon-controlled rectifiers and Schottky rectifiers) -- approximately 2.5 million units per year. Rectifier manufacture is a two step process: wafer fabrication and assembly. Silicon wafers are doped, spin coated, cleaned, and rinsed. Next, the wafers are etched and the resist is stripped to produce a final groove pattern. Layers of polysilicate and silicon nitride are deposited via chemical vapor deposition, silicon glass is fused to the surface ground, and then the wafer is cut into chips or dice. The dice are tested, sorted, and evaluated and then transferred to assembly. The team's report, detailing findings and recommendatios, indicated that the majority of waste was generated by the stack scrubbers used to remove contaminants from exhausted plant air and that the greatest savings could be obtained by redirecting reject water from the reverse osmosis unit to the stack scrubbers to eliminate the wastewater stream from the reverse osmosis unit.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Silicon controlled rectifiers, Manufacturing, Waste water, Water pollution control, Chemical vapor deposition, Air pollution control, Rinsing, Wafers, Etching, Cleaning, *Waste minimization, *Schottky rectifiers, Source reduction, SIC 20-39.

PB93-123107/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer of Penny Blanks and Zinc Products. Environmental research brief.
Tennessee Univ., Knoxville. Dept. of Engineering Science and Mechanics.
R. J. Jendrucko, and J. C. Maginn. Sep 92, 6p EPA/600/S-92/037
Grant EPA-R-814903
Prepared in cooperation with University City Science Center, Philadelphia, PA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The WMAC team at the University of Tennessee performed an assessment at a plant manufacturing penny blanks, dry cell battery cans, and other zinc products--approximately 120 million 1b/yr. Zinc ingots and scrap zinc are melted in an electric furnace. The molten zinc is formed into coils of strip for further procesing or sale to industrial customers. The circular penny blanks are formed in a press, upset to form a rim on the edge, copper plated, and visually inspected. Battery can blanks are pressed from the strip, drawn into can shape, cleaned, and dried. The team's report, detailing findings and recommendations, indicated that the most waste was generated as dross in melting the zinc and that the greatest savings could be obtained by reducing drag-out from the plating tanks to reduce downstream sludge formation and installing driers to dewater the sludge before shipment for disposal.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Metal industry, Manufacturing, Zinc, Electric batteries, Waste water, Water pollution control, Melting, Sludges, Dewatering, Dry cells, *Waste minimization, Source reduction, Penny blanks, SIC 20-39.

PB93-123115/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Finished Leather. Environmental research brief.
New Jersey Inst. of Tech., Newark.
P. Eyraud, and D. J. Watts. Oct 92, 6p EPA/600/S-92/039
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a manufacturer of finished leather. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Recommendations included: (1) change-over to water-based coatings; (2) installation of a solvent recovery/reuse capability; (3) use of a hand pump to reduce spillage during transfer and physical layout considerations to reduce the distances materials must be moved; (4) reducing the volume of the container for test mixes; (5) improvements to the computer-controlled spray-coating operation to reduce over-spray; and (6) the use of covers over formulated coating mixtures to reduce air emissions. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Leather, *Tanning materials, Manufacturing, Cost analysis, New Jersey, Solvents, Waste utilization, Coatings, Air pollution control, Chemical spills, *Waste minimization, Source reduction.

PB93-123123/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Paints Primarily for Metal Finishing. Environmental research brief.
New Jersey Inst. of Tech., Newark.
P. Eyraud, and D. J. Watts. Oct 92, 6p EPA/600/S-92/040
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that produces paints primarily intended for metal finishing. A site visit was made in 1990 during which several opportunities for waste minimization were identified. These opportunities include improved solvent handling techniques, reuse of some solvent washing wastes, and changes in equipment washing techniques. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Paints, *Metal finishing, New Jersey, Cost analysis, Manufacturing, Solvents, Materials handling, Washing, *Waste minimization, Source reduction.

PB93-123131/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Writing Instruments. Environmental research brief.
New Jersey Inst. of Tech., Newark.
P. Eyraud, and D. J. Watts. Oct 92, 6p EPA/600/S-92/041
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufacturers room writing instruments. A site visit was made in 1990 during which several opportunities for waste minimization were identified. These opportunities include reformulation of ink, reuse of rinse waters, changes in scheduling of ink production runs, and changes in degreasing techniques. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Writing, *Instruments, Manufacturing, New Jersey, Inks, Degreasing, Solvents, Waste water, Cost analysis, Waste utilization, *Waste minimization, Source reduction.

PB93-123149/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Room Air Conditioning Units and Humidifiers. Environmental research brief.
New Jersey Inst. of Tech., Newark.
H. Saqa, and D. J. Watts. Oct 92, 6p EPA/600/S-92/042
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufacturers room air conditioners and humidifiers. A site visit was made in 1990 during which several

opportunities for waste minimization were identified. These opportunities include more efficient recovery of degreasing solvents, movement to aqueous degreasing procedures, and segregation and reuse of hydraulic and lubricating fluids. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Air conditioners, *Humidifiers, Manufacturing, New Jersey, Solvents, Cost analysis, Degreasing, Waste utilization, *Waste minimization, Source reduction.

PB93-123156/REB PC **A01**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for an Autobody Repair Facility. Environmental research brief.
New Jersey Inst. of Tech., Newark.
K. Gashlin, and D. J. Watts. Oct 92, 5p EPA/600/S-92/043
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was an autobody repair facility. A site visit was made in 1990 during which several opportunities for waste minimization were identified. These opportunities include alternative spraying systems to improve transfer efficiency, increased use of water-based paints, and on-site distillation to permit recycling of solvents. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Repair shops, *Automobiles, New Jersey, Paint spraying, Paints, Cost analysis, Waste recycling, Solvents, Distillation, Environmental chemical substitutes, *Waste minimization, Source reduction.

PB93-123164/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Fabricator and Finisher of Steel Computer Cabinets. Environmental research brief.
New Jersey Inst. of Tech., Newark.
K. Gashlin, and D. J. Watts. Oct 92, 6p EPA/600/S-92/044
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a fabricator and finisher of steel computer cabinets. A site visit was made in 1990 during which several opportunities for waste minimization were identified. These opportunities include improved painting technology, rationalization of metal-working oils and coolants, and changes in degreasing solvent management. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Metal working, New Jersey, Painting, Manufacturing, Degreasing, Solvents, Cost analysis, Surface finishing, *Waste minimization, *Steel cabinets, Source reduction.

PB93-123172/REB PC **A01**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Artists Supply Paints. Environmental research brief.
New Jersey Inst. of Tech., Newark.
A. Ulbrecht, and D. J. Watts. Oct 92, 5p EPA/600/S-92/045
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a manufacturer of artists' supply paints. A site visit was made in 1990 during which several opportunities for waste minimization were identified. These opportunities include changes in the product formulation, reduction of spills and leaks of solvents, improved solvent handling techniques, improved equipment cleaning techniques, and recovery of waste solvents. Implementation of the identified waste minimization opportunities was part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Paints, Arts, New Jersey, Manufacturing, Cost analysis, Cleaning, Environmental chemical substitutes, Chemical spills, Solvents, Materials handling, Materials recovery, *Waste minimization, Source reduction.

PB93-123180/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Wire Stock Used for Production of Metal Items. Environmental research brief.
New Jersey Inst. of Tech., Newark.
A. Ulbrecht, and D. J. Watts. Oct 92, 6p EPA/600/S-92/046
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufactures wire stock used for production of metal items. The facility processes carbon steel and stainless steel coiled rods by cold drawing them into smaller diameter wire which is sold as stock for production of metal items such as ball bearings and springs. The process involves several surface cleaning and preparation steps in addition to simple cold drawing. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options identified included improvement of quality of acid wastes leading to beneficial secondary use, and modification of rinsing procedures to reduce flow of waste water. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Wire products, New Jersey, Manufacturing, Metal products, Rinsing, Waste water, Water pollution control, Cold drawing, *Waste minimization, Source reduction.

PB93-123198/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Commercial Refrigeration Units. Environmental research brief.
New Jersey Inst. of Tech., Newark.
K. Gashlin, and D. J. Watts. Oct 92, 6p EPA/600/S-92/047
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufactures commercial refrigeration units. The manufacturing operations include design, metal working, metal finishing, and blowing of polyethylene foam into panel jacketing for insulation purposes. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options identified included new techniques to reduce CFC emissions from foam manufacture, new foam production cleaning techniques to reduce methylene chloride usage, improved painting techniques to reduce VOC emissions and reduction of solvent wastes from general cleaning procedures. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Refrigerating machinery, *Refrigerators, New Jersey, Manufacturing, Fluorohydrocarbons, Freons, Design criteria, Cost analysis, Volatile organic compounds, Painting, Metal working, Metal finishing, Foam, Blowing agents, Cleaning, *Waste minimization, Source reduction.

PB93-123206/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Transporter of Bulk Plastic Pellets. Environmental research brief.
New Jersey Inst. of Tech., Newark.
H. Saqa, and D. J. Watts. Oct 92, 6p EPA/600/S-92/048
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a trucking company which specializes in the transportation of dry bulk plastic pellets from the manufacturer to the user. The pollution prevention opportunities assessment involved the techniques used to clean the tank trucks between shipments. This is done using large volumes of hot water. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options identified included recirculation of the water and use of compressed gasses as a partial replacement for the water stream used to clean the trucks. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Cargo transportation, New Jersey, Manufacturing, Cost analysis, Trucks, Cleaning, *Waste minimization, *Plastic pellets, Source reduction.

PB93-123214/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Electroplated Wire. Environmental research brief.
New Jersey Inst. of Tech., Newark.
A. Ulbrecht, and D. J. Watts. Oct 92, 6p EPA/600/S-92/049
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufactures electroplated wire for use in the automotive, computer, aerospace, and related industries. The wire is plated with copper, silver, nickel, tin, or tin-lead according to customer specifications. The process involves cleaning of the base wire followed by electroplating using a reel-to-reel technique. A site visit

was made in 1990 during which several opportunities for waste minimization were identified. Options identified included reduction of discharge volume, improved rinsing operations, changes in the wire drawing operation, and consideration of a zero-discharge system. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Wire processing, *Electroplating, New Jersey, Manufacturing, Cost analysis, Cleaning, *Waste minimization, Source reduction.

PB93-123222/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Systems to Produce Semiconductors. Environmental research brief.
New Jersey Inst. of Tech., Newark.
A. Ulbrecht, and D. J. Watts. Oct 92, 6p EPA/600/S-92/050
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufactures systems for vapor deposition of organometallic compounds or metals used in the production of semiconductors. As part of the manufacturing process it is necessary to test the systems using the materials actually used in semiconductor production. Test deposition of materials containing arsenic, indium, or gallium, among others result in much of the waste stream. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options identified included changes in degreasing procedures and modifications to filtering systems. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Semiconductors, *Vapor deposition, *Hazardous materials, Pollution abatement, New Jersey, Manufacturing, Degreasing, Implementation, Metal coatings, Filtration, Revisions, Performance evaluation, Metal containing organic compounds, *Waste minimization, *Source reduction.

PB93-123230/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Remanufacturer of Automobile Radiators. Environmental research brief.
New Jersey Inst. of Tech., Newark.
K. Gashlin, and D. J. Watts. Jul 92, 6p EPA/600/S-92/051
Grant EPA-R-815165
See also PB93-123222. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that remanufactures automobile radiators. The process involves cleaning the radiator, locating and repairing any leaks, painting, and reinstallation. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options identified include changes in the cleaning procedure, more efficient rinsing operations, and change of paint from solvent-based to water-based. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Repair shops, *Waste management, *Heat radiators, Pollution abatement, New Jersey, Cleaning, Painting, Implementation, Environmental chemical substitutes, *Waste minimization, *Source reduction, *Automobile radiators.

PB93-123248/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Fire Retardant Plastic Pellets and Hot Melt Adhesives. Environmental research brief.
New Jersey Inst. of Tech., Newark.
H. Saqa, and D. J. Watts. Oct 92, 6p EPA/600/S-92/052
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufactures fire retardant plastic pellets and hot melt adhesives. The manufacturing process for the plastic pellets uses a batch procedure in mixers where resins are combined with flame retardants and other additives. The mix is allowed to solidify and formed into pellets. The hot melt adhesive is produced by extruding a polymer with the necessary additives followed by washing and pelletizing. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options identified included changes in sequencing of production, modifications of waste water treatment practices, changes in hydraulic oil use and reuse practices. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Adhesives, New Jersey, Manufacturing, Fire resistant materials, Cost analysis, Additives, Batching, Water pollution control, Waste water, Solidification, *Waste minimization, *Plastic pellets, Source reduction.

PB93-124162/REB PC **E99**/MF **E99**
Proceedings: International Conference on Municipal Waste Combustion (2nd). Held in Tampa, Florida on April 16-19, 1991.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Nov 92, 1434p-in 3v
Set includes PB93-124170 through PB93-124196.

No abstract available.

PB93-124170/REB PC **A20**/MF **A04**
Proceedings: International Conference on Municipal Waste Combustion (2nd). Volume 1. Sessions P, 0, 1A, 2A, 3A, 4A, 6A, 6B, 9C and 10B. Held in Tampa, Florida on April 16-19, 1991. Rept. for Feb 91-Sep 92.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
J. D. Kilgroe, and S. J. Levy. Nov 92, 475p EPA/600/R-92/209A
See also Volume 2, PB93-124188.
Also available in set of 3 reports PC E99/MF E99, PB93-124162.

The three-volumes document 82 presentations by authors from 15 countries at the Second International Conference on Municipal Waste Combustion (MWC) in Tampa, Florida, April 16-19, 1991. The Conference fostered the exchange of current information on research concerning MWC, ash disposal and treatment, and flue gas cleaning as well as unit operating experience, regulatory developments, and plant siting considerations. Topics discussed included overviews on MWC from Canada, Europe, and the U.S.; MWC processes; dry/wet flue gas cleaning developments and operating experience; ash characterization, treatment, utilization, and disposal; chlorinated dioxin/furan control; environmental compliance; health risk; quality control/assurance; municipal waste management; mercury emission control; sampling and analysis; economic and social issues; and regulatory effects.

Keywords: *Pollution, *Combustion, *Waste treatment, *Municipalities, *Meetings, Flue gases, Ashes, Mercury(Metal), Public health, Waste disposal, Quality assurance, Sampling, Risk, Canada, Europe, United States, Economic factors, Regulations, Hydrocarbons, Dioxin.

PB93-124188/REB PC **A21**/MF **A04**
Proceedings: International Conference on Municipal Waste Combustion (2nd). Volume 2. Sessions 1B, 2B, 3B, 4B, 7A, 7B, 8A, 8B and 9B. Held in Tampa, Florida on April 16-19, 1991. Rept. for Feb 91-Sep 92.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
J. D. Kilgroe, and S. J. Levy. Nov 92, 476p EPA/600/R-92/209B
See also Volume 1, PB93-124170 and Volume 3, PB93-124196.
Also available in set of 3 reports, PC E99/MF E99, PB93-124162.

The three-volumes document 82 presentations by authors from 15 countries at the Second International Conference on Municipal Waste Combustion (MWC) in Tampa, Florida, April 16-19, 1991. The Conference fostered the exchange of current information on research concerning MWC, ash disposal and treatment, and flue gas cleaning as well as unit operating experience, regulatory developments, and plant siting considerations. Topics discussed included overviews on MWC from Canada, Europe, and the U.S.; MWC processes; dry/wet flue gas cleaning developments and operating experience; ash characterization, treatment, utilization, and disposal; chlorinated dioxin/furan control; environmental compliance; health risk; quality control/assurance; municipal waste management; mercury emission control; sampling and analysis; economic and social issues; and regulatory effects.

Keywords: *Combustion, *Waste treatment, *Municipalities, *Meetings, Flue gases, Public health, Quality assurance, Mercury(Metal), Sampling, Furans, Halohydrocarbons, Waste disposal, Pollution control, Risk, Quality control, Chlorine organic compounds, Waste management, Utilization, Ashes, Economic factors, Regulations, Dioxin.

PB93-124196/REB PC **A21**/MF **A04**
Proceedings: International Conference on Municipal Waste Combustion (2nd). Volume 3. Sessions 1C, 2C, 3C, 4C, 6C, 7C, 8C, 9A, and 10A/C. Held in Tampa, Florida on April 16-19, 1991. Rept. for Feb 91-Sep 92.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
J. D. Kilgroe, and S. J. Levy. Nov 92, 483p EPA/600/R-92/209C
See also Volume 2, PB93-124188.
Also available in set of 3 reports PC E99/MF E99, PB93-124162.

The three-volumes document 82 presentations by authors from 15 countries at the Second International Conference on Municipal Waste Combustion (MWC) in Tampa, Florida, April 16-19, 1991. The Conference fostered the exchange of current information on research concerning MWC, ash disposal and treatment, and flue gas cleaning as well as unit operating experience, regulatory developments, and plant siting considerations. Topics discussed included overviews on MWC from Canada, Europe, and the U.S.; MWC processes; dry/wet flue gas cleaning developments and operating experience; ash characterization, treatment, utilization, and disposal; chlorinated dioxin/furan control; environmental compliance; health risk; quality control/assurance; municipal waste management; mercury emission control; sampling and analysis; economic and social issues; and regulatory effects.

Keywords: *Combustion, *Waste treatment, *Municipalities, *Meetings, Flue gases, Public health, Sampling, Quality assurance, Mercury(Metal), Furans, Halohydrocarbons, Waste disposal, Pollution control, Risk, Quality control, Chlorine organic compounds, Waste management, Utilization, Ashes, Economic factors, Regulations, Dioxin.

PB93-124618/REB PC **A04**/MF **A01**
Survey of Data from the Continuous Sites of the 1990 Atlanta Ozone Precursor Study.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
J. H. Shreffler. Nov 92, 61p EPA/600/R-92/202

See also PB92-220656.

The report presents a survey of an air quality data base that was collected in Atlanta, Georgia during July and August 1990. In that period, data were collected continuously at six sites and were recorded as 1-hour averages. Data include concentrations of nitrogen oxides, carbon monoxide, ozone, total non-methane hydrocarbon, and 47 identified species of hydrocarbon. Supporting meteorological data were also recorded. The report contains extensive graphical representations of the data including: (1) mean diurnal curves for all gaseous pollutants and (2) plots of pollutant characteristics by wind direction. The automated gas chromatography (GC) systems used in the field in Atlanta produced erroneously high isopentane readings at five of the six sites; the problem appeared frequently and in a severe form at two of the sites.

Keywords: *Air quality data, *Air pollution monitoring, *Site surveys, Concentration(Composition), Data collection, Graphs(Charts), Nitrogen oxides, Carbon monoxide, Ozone, Non-methane hydrocarbons, Hydrocarbons, Wind direction, *Atlanta(Georgia).

PB93-124626/REB PC **A04**/MF **A01**
General Circulation Model Output for Forest Climate Change Research and Applications.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
E. J. Cooter, B. K. Eder, S. K. LeDuc, and L. Truppi.
Nov 92, 63p EPA/600/R-92/217

General Circulation Models (GCMs) have projected global warming of from 3 to 8 degrees F to take place over a period of from 50 to 100 years. The Forest Service Southern Global Change Program (SGCP) has proposed the use of GCM output as input to forest assessment models to estimate the potential impacts of climate changes on forests of the South and Southeastern U.S. The report reviews, organizes, summarizes and makes recommendations concerning the use of four climate model projections in forest assessments. Some primary sources of inter-model variability include model version (age), numerical solution technique, time and space resolution and parameterization schemes. Model version generally impacts the time and space resolution and choice of parameterization schemes. Magnitude of change varies widely, but the four GCMs examined here all project warmer air temperatures and higher humidities throughout the year, decreasing cloud cover during the Fall, Winter and Spring seasons and increasing summertime precipitation for the South and Southeastern U.S. Although some consensus among models over large geographic regions can be identified, there is, as yet, no established means of determining the confidence that can be placed in these outlooks. GCM output should be combined with historical case studies, empirical and semi-empirically constructed climate scenarios to provide a range of possible climatological futures.

Keywords: *Forests, *Climatic changes, *Mathematical models, General circulation models, Global warming, Environmental effects, Air pollution, Forecasting, Environmental impact assessments, Atmospheric temperature, Humidity, Seasons, Numerical analysis, Carbon dioxide, *Southern Region(United States), *Southeast Region(United States).

PB93-124634/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Interim Protocol for Testing the Effects of Microbial Pathogens on Subterranean Termites ('Isoptera: rhinotermitidae').
Hawaii Univ., Honolulu.
K. Grace. Nov 92, 18p EPA/600/R-92/215
Sponsored by Corvallis Environmental Research Lab., OR.

Although subterranean termites are frequent targets of pest control measures around buildings and other human constructions, they are also ubiquitous in both wooded and desert regions of North America and are likely to suffer unintended exposure to microbial pest control agents (MPCAs). There are few reports of pathogens isolated from termites, and little information available on the toxicity of MPCAs. This report describes test procedures generally suitable for evaluation of MPCAs based upon pathogenic fungi and other pathogens where mortality may reasonably be expected to occur within a 15-day period. If a longer pattern of mortality is anticipated, then the test period may need to be extended.

Keywords: *Biological pest control, *Termites, *Fungi, Toxicity, Species diversity, Mortality, *Isoptera.

PB93-124667/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Carbon Disulfide Emission Control Options.
TRC Environmental Corp., Chapel Hill, NC.
R. Gupta, L. Harris, and D. Tulis. Sep 92, 50p EPA/450/3-91/023
Contract EPA-68-D0-0121
See also PB93-110716 and PB84-200625. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The EPA Control Technology Center, OAQPS, has received numerous inquiries regarding control options for carbon disulfide emissions. This report presents a description of methods or techniques used to control carbon disulfide emissions from a variety of source categories, and discusses the feasibility of application of each technique presented. The report briefly discusses various options available to public and private industry for controlling carbon disulfide emissions, and serves as a reference source for those seeking further information.

Keywords: *Air pollution control, *Carbon disulfide, Technology utilization, Pollution sources, substitutes, Performance evaluation, US EPA, Absorption, Adsorption, Scrubbing, Sorbents, Oxidation, Catalysts, Activated carbon treatment.

PB93-124675/REB PC **A07**/MF **A02**
Department of Agriculture, Washington, DC.
Proceedings of National Integrated Pest Management Forum. Held in Arlington, VA., on June 17-19, 1992.
Environmental Protection Agency, Washington, DC.
Jun 92, 145p EPA/540/09-93/233
See also PB86-138906. Sponsored by Department of Agriculture, Washington, DC.

The National Integrated Pest Management Forum was held June 17 - 19, 1992 in Arlington, Virginia, to discuss the constraints to the broader adoption of IPM in American agriculture and to develop resolutions for overcoming these constraints. Over 500 people attended the plenary and working sessions and poster exhibits, representing the agrichemical, biotechnology, and food processing industries, farms and farm organizations, environmental and consumer organizations, colleges and universities, and federal and state governments. The proceedings of the Forum contain speeches from leaders in these sectors, as well as technical presentations on IPM and reports from the constraint and resolution discussions.

Keywords: *Meetings, *Agriculture, *Pest control, Agricultural chemicals, Biotechnology, Food processing, Industry, Farms, Environmental surveys, Consumer products, Pollution control agencies, State government, National government.

PB93-124683/REB PC **A02**/MF **A01**
RED Facts: Sodium Hydroxide.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Sep 92, 6p EPA/738/F-92/008
See also PB93-124691, PB88-174545, and PB88-231949.

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet for sodium hydroxide summarizes EPA's conclusion, as set forth in the Reregistration Eligibility Document (or RED), that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, *Sodium hydroxides, Regulations, Herbicides, Fungicides, Disinfectants, Biocides, Agricultural products, Toxicology, Risk assessment, Public health, Ecology, Path of pollutants, Labels, *Chemical Information Fact Sheet, *Reregistration, Use patterns, Science findings, CAS 1310-73-2.

PB93-124691/REB PC **A07**/MF **A02**
Reregistration Eligibility Document (RED): Sodium Hydroxide.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
30 Sep 92, 147p EPA/540/RS-93/235
See also PB93-124683.

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The Reregistration Eligibility Document (or RED) for sodium hydroxide discusses the scientific data and other information supporting EPA's regulatory conclusion that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, *Sodium hydroxides, Guidelines, Standards, Regulations, Toxicology, Path of pollutants, Ecology, Agricultural products, Risk assessment, Labels, Public health, Herbicides, Fungicides, Disinfectants, Biocides, *Reregistration, Federal Insecticide Fungicide and Rodenticide Act, CAS 1310-73-2.

PB93-124998/REB PC **A05**/MF **A01**
Financing Models for Environmental Protection: Helping Communities Meet Their Environmental Goals.
Environmental Protection Agency, Washington, DC. Office of Administration and Resources Management.
Sep 92, 96p EPA/202/B-92/006

In 1989, EPA launched the Public-Private Partnerships (P3) Program to bring together public and private interests to meet the demands of future environmental protection. The Public-Private Partnerships Demonstration Program, as the applied component of the larger P3 initiative, was created to: Provide communities with real-life examples of models to finance environmental projects; Develop, test, and increase the awareness and acceptance of public-private partnerships and other financing arrangements; Compare different financial arrangements and obtain information concerning the barriers to and incentives for establishing public-private partnerships; and Offer communities much-needed assistance.

Keywords: *Project management, *Environmental protection, *Services, Communities, Models, Financing, Barriers, Pollution prevention, Markets, Solid wastes, Waste disposal, Recycling, Earth fills, *Partnerships, *Environmental projects, Ownership, Cooperatives, Case studies.

PB93-126126/REB PC **A03**/MF **A01**
Successful Practices in Title 3 Implementation Chemical Emergency Preparedness and Prevention Technical Assitance Bulletin. Series 6, Number 8.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Oct 91, 33p OSWER-91-006.2

This is another in a series of bulletins that EPA is issuing to provide examples of implementation programs and strategies of the Emergency Planning and Community Right-to-Know Act of 1986, known as Title III, that are innovative or have proven effective. The purpose of these bulltins is to share information on successful practices with Local Emergency Planning Committees (LEPCs), State Emergency Response Commissions (SERCs), fire departments, and other Title III implementing agencies throughout the country in the hope that such information will prove useful to other SERCs and LEPCs as their programs develop and evolve.

Keywords: *Emergency planning, *Information transfer, *Environmental protection, US EPA, Case studies, Implementation, New Jersey, Wisconsin, Missouri, Hawaii, Colorado, *Emergency Planning and Community Right-to-Know Act of 1986, Cherry Hill(New Jersey), Manitowoc County(Wisconsin), Greene County(Missouri), Arapahoe County(Colorado).

PB93-126175/REB PC **A03**/MF **A01**
Bioremediation: An Information Update on Applying Bioremediation to Site Cleanup.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Mar 92, 34p EPA/540/N-92/001
See also PB92-224708 and PB92-224807.

The Bioremediation Field Initiative was established to provide the U.S. Environmental Protection Agency (EPA) and State Project Managers, consulting engineers, and industry with timely information regarding new developments in the application of bioremediation at hazardous waste sites. The initiative provides evaluation of the performance of selected full-scale field applications; provides technical assistance to Remedial Project Managers (RPMs) and On-Scene Coordinators (OSCs), through the Technical Support Centers; and is developing a data base on the field applications of bioremediation, which is summarized in this bulletin.

Keywords: *Biological treatment, *Remedial action, *Waste management, *Hazardous materials, Microorganisms, Superfund, Pollution regulations, Performance evaluation, Field tests, Biodeterioration, Information transfer, Tables(Data), Aquifers, *Cleanup operations, Toxic Substances Control Act, Innovative treatment technologies, Remedial Project Managers, On-scene Coordinators, Resource Conservation and Recovery Act.

PB93-126183/REB PC **A03**/MF **A01**
News Notes, Number 22: The Condition of the Environment and the Control of Nonpoint Sources of Water Pollution.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Jul 92, 28p EPA/841/N-92/003

Contents: Two Commentaries; Noteworthy Water Quality Happenings; News From The States; Notes on The Public Lands and Watershed Management; Notes on NPS Technology; Agricultural Notes; Notes on Environmental Education; NPS Electronic Bulletin Board (BBS) News; and Announcements of Interest.

Keywords: *Grazing land, *Agricultural economics, *Conservation, Cultivation, Public land, Water supply, Water quality, Rangeland, Arkansas, Oklahoma, Maine, Montana, Europe, Forests, Lumbering, Education, Runoff, Urban areas, California, Virginia, Public land, Sustainable Agriculture.

PB93-126217/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Orthopedic Implants. Environmental research brief.
New Jersey Inst. of Tech., Newark.
A. Ulbrecht, and D. J. Watts. Oct 92, 6p EPA/600/S-92/064
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufactures orthopedic implants for use by the health care industry. The parts are produced in a molding operation using stainless steel or cobalt chromium alloy. Computer-controlled cutting is used to produce the bearings for the implants according to precise specifications.

Keywords: *Implantation, *Orthopedics, *Waste minimization, Assessments, Stainless steel, Solvents, Molding, Cobalt alloys, Chromium steels, Chromium alloys, Distillation, Savings, Cutting, Degreasing, Cost analysis.

PB93-126225/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Commercial Dry Cleaning Equipment. Environmental research brief.
New Jersey Inst. of Tech., Newark.
H. Saga, and D. J. Watts. Jul 92, 6p EPA/600/S-92/062
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufactures machinery used for commercial dry cleaning operations. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options identified for waste reduction included improvement of spray painting operations and recycling opportunities for wood scrap. In addition there is an option mentioned to encourage the change of refrigerant to a non-CFC chemical. Implementation of the identified-waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Reduction, *Waste minimization, Machinery, Dry cleaning, Spray painting, Assessments, Wood wastes.

PB93-126233/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Fossil Fuel Fired Electrical Generating Station. Environmental research brief.
New Jersey Inst. of Tech., Newark.
K. Gashlin, and D. J. Watts. Oct 92, 7p EPA/600/S-92/061
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility which is a fossil fuel fired electricity generating station. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Wastes are generated by several activities which are supportive of the operation of the station. Options identified for waste reduction included improved management of waste oil, changes in solvent usage, use of rechargeable batteries, and changes in painting practices. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste minimization, *Pollution control, Fossil fuels, Electric power generation, Reduction, Solvents, Batteries, Painting.

PB93-126241/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Plastic Containers by Injection Molding. Environmental research brief.
New Jersey Inst. of Tech., Newark.
H. Saga, and D. J. Watts. Jul 92, 6p EPA/600/S-92/060
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufactures plastic containers by injection molding. The manufacturing process involves melting of a plastic resin and injection of the melt into molds in the shape of the container to be manufactured. The cooled and solidified container is removed from the mold, the mold is cleaned with solvent when required and the injection process is repeated. A portion of the containers are also made by blow molding which involves use of compressed gas to move the resin melt onto the walls of the mold. The rest of the operation is similar. A site visit was made in 1990 during which several opportunities for waste minimization were identified.

Keywords: *Containers, *Plastics, *Waste minimization, *Pollution control, Assessments, Businesses, Sites, Manufacturing, Injection molding, Resins, Cooling, Solvents, Operations, Compressed air, Gases, Equipment, Pollution prevention.

PB93-126258/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Electroplating Chemical Products. Environmental research brief.
New Jersey Inst. of Tech., Newark.
A. Ulbrecht, and A. J. Watts. Oct 92, 6p EPA/600/S-92/059
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that produces chemicals for use in electroplating baths. The process formulates and blends concentrates of metal salts and additives which are used in electroplating and other metal finishing operations. The resulting solutions are clarified and tested for quality and consistency. A site visit was made in 1990 during which several opportunities for waste minimization were identified.

Keywords: *Electroplating, *Waste minimization, Metal finishing, Ion exchanging, Quality control, Cost analysis, Electrowinning.

PB93-126266/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Scrap Metal Recovery Facility. Environmental research brief.
New Jersey Inst. of Tech., Newark.
H. Saga, and D. J. Watts. Jul 92, 6p EPA/600/S-92/058
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that processes scrap metal to recover refined metals for reuse. The facility concentrates on recovery of tungsten, molybdenum, and tantalum. The processes used by the facility involve washing, degreasing, mechanical cleaning, and acid treatment. A site visit was made in 1990 during which several opportunities for waste minimization were identified.

Keywords: *Metal scrap, *Waste minimization, *Pollution control, Businesses, Sites, Tungsten, Molybdenum, Tantalum, Washing, Metal cleaning, Acids, Degreasing, pH, Precipitation(Chemistry), Solids, Waste water reuse, Cost analysis.

PB93-126282/REB PC **A02**/MF **A01**
Saint Louis Univ., MO. Graduate School.
Waste Reduction Activities and Options for a Manufacturer of Hardened Steel Gears. Environmental research brief.
New Jersey Inst. of Tech., Newark.
A. Ulbrecht, and D. J. Watts. Jul 92, 6p EPA/600/S-92/057
Grant EPA-R-815165
Sponsored by Saint Louis Univ., MO. Graduate School.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufactures hardened steel gears of various sizes and application. The manufacturing steps include grinding, cutting, degreasing, and surface finishing. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options for pollution prevention include changes in use of metal working coolants, degreasing operations, and the rinsing procedures used in the plating operations. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Hazardous materials, *Gears, *Pollution abatement, New Jersey, Manufacturing, Surface finishing, Grinding(Material removal), Degreasing, Metal working, Cutting, Cost analysis, *Waste minimization, Source reduction.

PB93-126290/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Laminator of Paper and Cardboard Packages. Environmental research brief.
New Jersey Inst. of Tech., Newark.
H. Saga, and D. J. Watts. Jul 92, 6p EPA/600/S-92/056
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that laminates paper and cardboard substrates which are used for packaging purposes. The lamination is accomplished by application of a liquid laminate to the surface of the substrate followed by curing. The facility also applies metallic coatings to similar substrates by transfer from mylar films. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options identified included changing to UV curing for laminates and on-site distillation and reuse for solvent. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Hazardous materials, *Waste management, *Laminating, *Paper industry, *Pollution abatement, New Jersey, Curing, Waste utilization, Solvents, Metal coatings, Performance evaluation, Packaging materials, Paperboards, Cost analysis, *Waste minimization, Source reduction.

PB93-126308/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of Fine Chemicals Using Batch Processes. Environmental research brief.
New Jersey Inst. of Tech., Newark.
P. Fyraud, and D. J. Watts. Jul 92, 6p EPA/600/S-92/055
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a manufacturer of fine chemicals using batch processes. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options identified for waste reduction included initiation of solvent recycling or reconditioning for reuse and modifying the chemical reaction conditions to improve product quality and reduce the amount of reprocessing which has been necessary. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Chemical industry, New Jersey, Chemical compounds, Solvents, Chemical reactions, Waste utilization, Batching, Cost analysis, *Waste minimization, Source reduction.

PB93-126316/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Manufacturer of General Purpose Paints and Painting Supplies. Environmental research brief.
New Jersey Inst. of Tech., Newark.
A. Ulbrecht, and D. J. Watts. Jul 92, 6p EPA/600/S-92/054
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a facility that manufactures both oil-based and water-based paints for general purpose use. The paint is produced by mixing solvent, pigment, and other ingredients, all of which are purchased from vendors. The facility already practices many pollution prevention concepts. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options identified include improved scheduling techniques, reuse of rinses, and formulation of residues into other products. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Paints, New Jersey, Manufacturing, Waste utilization, Waste recycling, Cost analysis, Solvents, Pigments, *Waste minimization, Source reduction.

PB93-126399/REB PC **A10**/MF **A03**
Proceedings of the EPA's Contaminated Sediment Management Strategy Forums.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Sep 92, 219p EPA/823/R-92/007

The abstract on March 5, 1992, the EPA distributed a draft outline of EPA's Contaminated Sediment Management Strategy as a proposal for discussion. The Agency also solicited written public comment and issued an invitation to attend three public forums to discuss the draft. The document summarizes the proceedings of these EPA-sponsored forums. Each forumaddressed a particular issue related to development of the Contaminated Sediment Management Strategy. These proceedings summarize the presentations at these forums and captures the highlights of comments, questions, and input from the participants.

Keywords: *Management, *Sediments, *Water pollution, *Meetings, Contaminants, Public opinion, Response, State government, National government, Chemical industry, Manufacturers, Recommendations, Strategic planning.

PB93-126407/REB PC **A06**/MF **A02**
Guide for Conducting Contaminant Source Inventories for Public Drinking Water Supplies. Technical Assistance Document.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Dec 91, 102p EPA/570/9-91/033

The technical assistance document assists state and local water managers in developing and refining methods and procedures for inventorying existing and potential sources of contamination within wellhead protection areas. The document discusses the design, structure, and function of contaminant source inventories. There are detailed discussions of contaminant sources of concern and methodologies for identifying these sources. There are also suggestions on how to manage the information collected on these sources and how to use the information to protect public drinking water supplies. The document also contains case studies of contaminant source inventories, which a excellent examples of wellhead protection in action.

Keywords: *Water wells, *Water supply, *Pollution control, Ground water, Inventories, Sources, Contaminants, Public utilities, Design, Water quality, Risk assessments, Allocations, Surveys, *Drinking water, Case studies, Wellhead protection.

PB93-126563/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for a Printing Plate Preparation Section of a Newspaper. Environmental research brief.
New Jersey Inst. of Tech., Newark.
A. Ulbrecht, and D. J. Watts. Jul 92, 6p EPA/600/S-92/053
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was a printing plate preparation area of a large circulation newspaper printing facility. The areas of concern on the part of the publishing company that lead to the waste minimization opportunities assessment were levels of contaminants in their waste water which were above the limits established by the local sewage authority. The process used for plate preparation is fundamentally a photographic transfer operation involving developing and fixing photographic films. A site visit was mde in 1990 during which several opportunities for waste minimization were identified. Options included changes in some of the chemicals used in the process, reduced levels of rinse water, and improved silver recovery technology. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Waste management, *Pollution abatement, *Hazardous materials, *Platemaking(Printing), New Jersey, Printing equipment, Manufacturing, Newspaper, Materials recovery, Environmental chemical substitutes, Waste water, Cost analysis, *Waste minimization, Source reduction.

PB93-126571/REB PC **A05**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Application of a Data-Assimilating Prognostic Meteorological Model to Two Urban Areas.
Systems Applications International, San Rafael, CA.
S. G. Douglas. Aug 92, 80p EPA/600/R-92/221
Contract EPA-68-D9-0066
See also PB92-103209 and PB92-103217. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

In the study the authors have used a data-assimilating prognostic meteorological model, the Systems Applications International Mesoscale Model (SAIMM), to generate meteorological fields suitable for photochemical modeling of two urban areas: Los Angeles, California and the Lower Lake Michigan area which includes Chicago, Illinois; Milwaukee, Wisconsin; Gary, Indiana; and Muskegon, Michigan. The objectives of the study were to test the ability of the SAIMM to provide accurate meteorological fields for photochemical modeling of the Los Angeles and Lower Lake Michigan urban areas and to investigate the meteorological data requirements needed to support the use of the SAIMM four-dimensional data assimilation (FDDA) procedure. For Los Angeles the SAIMM/FDDA procedure was tested using observational data collected during the 1987 Southern California Air Quality Study (SCAQS) and was applied to 25 June (one of the SCAQS episode days); for the Lower Lake Michigan area the procedure was tested using observational data collected during the 1991 Lake Michigan Ozone Study (LMOS) and was applied to 26 June (one of the LMOS episode days).

Keywords: *Air pollution, *Atmospheric models, *Pollution transport, *Urban areas, Ozone, Lake Michigan, Air pollution monitoring, Atmospheric temperature, Wind profiles, Los Angeles(California).

PB93-126589/REB PC **A05**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Survey of Portable Analyzers for the Measurement of Gaseous Fugitive Emissions. Final rept.
Radian Corp., Research Triangle Park, NC.
T. Skelding. Nov 92, 76p EPA/600/R-92/219
Contract EPA-68-D1-0010
See also PB81-234262 and PB81-234817. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The document presents a summary of currently available portable gaseous fugitive emissions analyzers, which analyzers are in common use by industry, the type of analyses being performed, compounds for which the analyzers are being used, and typical problems encountered with operating these analyzers in the field. The principles of operation, advantages and limitations of the various instruments are also discussed. The information contained in the document is based primarily on a review of manufacturers' literature and discussions with the users community.

Keywords: *Gas detectors, *Air pollution, Performance evaluation, Portable equipment, Volatile organic compounds, Concentration(Composition), Field tests, Operations, Requirements, Electrochemistry, Surveys, Mine safety, Photo synthesis, Flame ionization detectors.

PB93-126597/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Guide for Conducting Treatability Studies under CERCLA: Thermal Desorption Remedy Selection. Interim Guidance.
Science Applications International Corp., Cincinnati, OH.
J. Rawe. Sep 92, 47p EPA/540/R-92/074A
Contract EPA-68-C8-0062
See also PB93-121325. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Systematically conducted, well-documented treatability studies are an important component of remedy evaluation and selection under the Superfund program. The manual focuses on thermal desorption remedy selection treatability studies conducted in support of remedy selection that is conducted prior to the Record of Decision (ROD). The manual presents a standard guide for designing and implementing a thermal desorption remedy selection treatability study. The manual presents a description of and discusses and defines the prescreening and field measurement data needed to determine if treatability testing is required. It also presents an overview of the process of conducting treatability tests and the applicability of tiered treatability testing for evaluation of thermal desorption technologies. The specific goals of each tier of testing are defined and performance levels are presented that should be met at the remedy screening level before additional tests are conducted at the next tier. The elements of a treatability study work plan are also defined with detailed discussions on the design and execution of the remedy screening treatability study.

Keywords: *Heat treatment, *Superfund, *Remedial action, *Waste management, *Organic compounds, Guidelines, Performance evaluation, Experimental design, Sampling, *Thermal desorption, Cleanup operations.

PB93-126613/REB PC **A05**/MF **A01**
Superfund Innovative Technology Evaluation Program: Progress and Accomplishments Fiscal Year 1991. A 5th Report to Congress.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Oct 92, 82p EPA/540/R-92/076
See also PB92-224799.

The Superfund Innovative Technology Evaluation (SITE) program was the first major program for demonstrating and evaluating full-scale innovative treatment technologies at hazardous waste sites. Having concluded its fifth year, the SITE program is recognized as a leading advocate of innovative technology development and commercialization for hazardous waste treatment and remediation. In addition, through the demonstration of innovative monitoring and measurement technologies, EPA is promoting faster, more cost-effective site characterization and post-cleanup monitoring methods for Superfund and Resource Conservation and Recovery Act (RCRA) corrective action sites. The fifth report to Congress documents the impact of the SITE program through discussing the program's progress and accomplishments over the past year. The report also sets goals for the coming years and makes specific recommendations on achieving these goals.

Keywords: *Hazardous materials, *Waste treatment, *Remedial action, Technology innovation, Pollution regulations, Environmental monitoring, Site characterization, Cost effectiveness, Superfund, Land pollution control, Recommendation, *Innovative treatment technologies, *Superfund Innovative Technology Evaluation Program, Cleanup operations, Resource Conservation and Recovery Act.

PB93-126621/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Minimization Assessment for a Manufacturer Producing Printed Circuit Boards. Environmental research brief.
Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
H. W. Edwards, M. Kostrzewa, and P. S. Miller. Sep 92, 6p EPA/600/S-92/033
Grant EPA-R-814903
See also PB92-196344. Prepared in cooperation with University City Science Center, Philadelphia, PA. 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 waste but who lack the expertise to do so. The WMAC team at Colorado State University performed an assessment at a plant which manufactures single-sided, double-sided, and multilayer printed circuit boards – approximately 259,000 sq ft/yr. Circuit patterns are created on the boards and foil layers with a dry-film photoresist process and the multilayer boards are built up. The actual copper circuit pattern is generated by a series of photolithographic and plating processes. Final processing includes legend application, routing, rinsing, electrical testing, inspections, packing, and shipping. The team's report, detailing findings and recommendations, indicated that the majority of waste was generated in the plating lines and that the greatest savings could be obtained by installing a spray rinse and electrowinning system on the first rinse tank of the electrolytic copper plating line to reduce both copper plating rinse water (88 percent) and plating sludge (80 percent) due to drag-out in the first rinse tank.

Keywords: *Waste management, *Hazardous materials, *Pollution abatement, *Printed circuits, Manufacturing, Waste water, Plating, Photolithography, Water pollution control, Rinsing, Sludges, Electrowinning, *Waste minimization, Source reduction, SIC 20-39.

PB93-126639/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Waste Reduction Activities and Options for an Electrical Utility Transmission System Monitoring and Maintenance Facility. Environmental research brief.
New Jersey Inst. of Tech., Newark.
K. Gashlin, and D. J. Watts. Oct 92, 6p EPA/600/S-92/063
Grant EPA-R-815165
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency (EPA) funded a project with the New Jersey Department of Environmental Protection and Energy (NJDEPE) to assist in conducting waste minimization assessments at thirty small- to medium-sized businesses in the state of New Jersey. One of the sites selected was an electrical utility transmission system monitoring and maintenance facility which has the responsibility to monitor, maintain, and repair the distribution system for the electrical service provided in a defined geographical area by a regulated public utility. A site visit was made in 1990 during which several opportunities for waste minimization were identified. Options identified for waste reduction included more accessible inventory records to determine which transformers may contain PCB's to reduce the quantity of oil listed as PCB-containing, changing procedures for vehicle oil changes, a search for alternatives for electrical connection degreasing, and change to low-solvent or water-based coatings for transformer reconditioning. Implementation of the identified waste minimization opportunities was not part of the program. Percent waste reduction, net annual savings, implementation costs and payback periods were estimated.

Keywords: *Hazardous materials, *Pollution abatement, *Waste management, *Electric power transmission, New Jersey, Polychlorinated biphenyls, Maintenance, Degreasing, Transformers, Environmental chemical substitutes, Electric utilities, Oils, Cost analysis, *Waste minimization, Source reduction.

PB93-126787/REB PC **A05**/MF **A01**
Guide for Conducting Treatability Studies under CERCLA. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 92, 83p EPA/540/R-92/071A, OSWER DIRECTIVE-9380.3-10
See also PB91-249772.

Systemically conducted, well-documented treatability studies are an important component of the removal process, remedial investigation/feasibility study (RI/FS) process and the remedial design/remedial action (RD/RA) process under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The guide describes a three-tiered approach for conducting treatability studies that consists of (1) remedy screening, (2) remedy-selection testing, and (3) RD/RA testing.

Keywords: *Hazardous materials, *Waste treatment, Guidelines, Screening, Removal, Selection, Tests, Quality control, Safety, Regulations, *Superfund, *Remedial action, Comprehensive Environmental Response Compensation and Liability Act, Cleanup.

PB93-127793/REB PC **A05**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Guides to Pollution Prevention: Metal Casting and Heat Treating Industry.
Battelle, Columbus, OH.
Sep 92, 78p EPA/625/R-92/009
Contract EPA-68-C0-0003
See also PB86-124906 and PB87-150959. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The guide provides an overview of the major waste generating process of metal casting and heat treating operations and presents options for reducing the waste through source reduction and recycling. Most waste generated by the metal casting, or foundry, industry is from melting operations, metal pouring, and disposal of spent molding materials. Most waste generated by the heat treating industry is from spent baths (e.g. cyanide solutions), spent quenchants, wastewater from parts cleaning, spent abrasive media, refractory material, and masking processes. To help companies in the metal casting and heat treating industry determine waste reduction opportunities, the guide provides a set of worksheets which take the user step by step through an analysis of the on-site waste generating operations and the possibilities for minimizing each waste. The guide is also intended to be instructive to consultants who serve the industry and government agencies who regulate it.

Keywords: *Pollution abatement, *Water pollution control, *Castings, *Heat treatment, *Metal industry, Industrial waste treatment, Cleaning, Foundries, Guidelines, Waste recycling, Metal scrap, Hazardous materials, Refractory materials, Masking, *Waste minimization, Source reduction.

PB93-127801/REB PC **A06**/MF **A02**
Review and Evaluation of Current Methods and User Needs for Other Stationary Combustion Sources. Final rept.
TRC Environmental Corp., Chapel Hill, NC.
D. Winkler, D. Zimmerman, and S. Lowe. Nov 92, 122p EPA/600/R-92/224
Contract EPA-68-D9-0173

The report gives results of Phase 1 of an effort to develop improved methodologies for estimating area source emissions of air pollutants from stationary combustion sources. The report (1) evaluates Area and Mobile Source (AMS) subsystem methodologies; (2) compares AMS results with National Emissions Data System (NEDS) results; (3) describes and evaluates U.S. Department of Energy (DOE) data sources; (4) confirms user needs; and (5) gives source characterizations for kerosene heaters, methane combustion at publicly owned treatment works (POTWs), and field crude oil consumption. It includes data flow charts to describe how energy consumption is estimated for DOE's State Energy Data Report.

Keywords: *Stationary sources, *Air pollution, *Combustion products, *Information transfer, Study estimates, Reviews, Data base management, State implementation plans, US DOE, Methane, Heating equipment, Data collections, Reviews, Energy consumption, Comparison, Forest fires, Waste disposal, Mobile pollutant sources, Emission factors, User needs, Burning, *Area and Mobile Source Subsystem, *Area sources, National Emissions Data System, Publicly Owned Treatment Works.

PB93-128007/REB PC **A06**/MF **A02**
Guide to Performing Reinspections under the Asbestos Hazard Emergency Response Act (AHERA).
Environmental Protection Agency, Washington, DC. Office of Pollution, Prevention, and Toxics.
Feb 92, 107p EPA/700/B-92/001
Prepared in cooperation with Westat, Inc., Rockville, MD.

Under the Asbestos Hazard Emergency Response Act (AHERA), the United States Environmental Protection Agency (EPA) requires each elementary and secondary school to perform an inspection for asbestos-containing building material (ACBM) and to prepare an asbestos management plan. The AHERA regulations further require a reinspection of the ACBM at least once every 3 years. The reinspection guide will assist: Local Education Agencies (LEAs); AHERA designated persons, Asbestos inspectors, and Management planners in meeting the specific requirements for an AHERA reinspection. Further, it provides guidance for improving the accuracy and quality of information available about ACBM during the reinspection. The reinspection period provides an excellent opportunity for schools to re-evaluate and update their programs for managing asbestos. EPA recently issued general guidelines for asbestos in buildings in an advisory letter from the EPA Administrator which was sent to all LEAs. The guide addresses only the Federal requirements for reinspections. A school may also be subject to State or local requirements not discussed here.

Keywords: *Inspections, *Asbestos, *Air pollution abatement, *School buildings, Guidelines, Pollution regulations, Indoor air pollution, Construction materials, Requirements, National government, Management planning, Building codes, Compliance, Inspectors, Records, Reviews, *Asbestos Hazard Emergency Response Act.

PB93-128015/REB PC **A04**/MF **A01**
Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.
Agricultural NPS Control of Phosphorus in the New York State, Lake Ontario Basin. Volume 1. Delivery of Phosphorus to Lake Ontario from Cultivated Mucklands in Oak Orchard Creek Watershed. Final rept. 1985-86.
New York State Dept. of Environmental Conservation, Albany. Div. of Water.
P. Longabucco, and M. R. Rafferty. Feb 91, 72p EPA/905/9-91/006A, , GL-06A/91
Contract EPA-R005725-01
See also PB93-128031. Sponsored by Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

Cultivated mucklands in western New York State were investigated as a nonpoint source of phosphorus to Lake Ontario. The 70,500-ha Oak Orchard Creek watershed, which drains to Lake Ontario, was selected for the study area. It is located in Genesee and Orleans Counties, New York, and contains 3250 ha of heavily fertilized muck cropland on which predominantly vegetable crops are grown. The creek was monitored at several sites from May 1984 through April 1985 to determine the role of the mucklands in annual phosphorus loading to the lake. At an upstream site which drained approximately 10,200 ha, including the majority of the muck cropland, the creek load was 18,000 kg of total phosphorus with 75 percent of it as dissolved reactive phosphorus.

Keywords: *Phosphorous, *Agricultural runoff, *Lake Ontario, *Watershed management, New York, Nonpoint sources, Sediments, Pesticide residues, Water chemistry, Nutrient removal, *Oak Orchard Creek Watershed, Muck soils.

PB93-128023/REB PC **A04**/MF **A01**
Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.
Agricultural NPS Control of Phosphorus in the New York State, Lake Ontario Basin. Volume 2. Fertilizer Trials on Organic Soils in the Lake Ontario Drainage Basin. Final rept. 1985-86.
Cornell Univ. Agricultural Experiment Station, Ithaca, NY. Dept. of Agronomy.
S. Klausner, J. Duxbury, and E. Goyette. Feb 91, 63p EPA/905/9-91/006B, , GL-06B/91
Contract EPA-R005725-01
See also PB93-128015. Sponsored by Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

There are approximately 2.3 million hectares of cropland in New York. Cultivated organic soils comprise about 12,000 hectares or 0.5% of the total cropped land. The organic soils are used exclusively for intensive vegetable production with onions being the primary crop. About 50% of these soils are located within the Lake Ontario drainage basin. A comprehensive field study was conducted to evaluate the yield response of onions across a broad range of N, P, and K fertilizer inputs and to correlate the level of response with soil testing parameters. A primary objective was to develop an estimate of P loss in drainage water to the Lake Ontario drainage basin and how this loss is influenced by P fertilizer management.

Keywords: *Phosphorous, *Lake Ontario, *Watershed management, *Agricultural runoff, *Fertilization, Nonpoint sources, Water quality, Onions, Yield, Soil chemistry, New York.

PB93-128031/REB PC **A06**/MF **A02**
Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.
Agricultural NPS Control of Phosphorus in the New York State, Lake Ontario Basin. Volume 3. The Influence of Tillage on Phosphorus Losses from Manured Cropland. Final rept. 1985-86.
New York State Coll. of Agriculture and Life Sciences, Ithaca. Dept. of Agricultural and Biological Engineering.
P. D. Robillard, and M. F. Walter. Feb 91, 118p EPA/905/9-91/006C, , GL-06C/91
Contract EPA-R005725-01/02
See also PB93-128023. Sponsored by Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

A sprinkling infiltrometer was used to evaluate total phosphorus (TP) and total soluble phosphorus (TSP) losses in surface runoff from plots receiving manure application rates of 22-135 MT/ha and from plots where manure had been incorporated to depths varying from 0-20 cm. Both laboratory and field trials were conducted utilizing simulated precipitation. Infiltrometer runs were repeated for various drying conditions of the soil manure mixture at time intervals varying from 1-30 days. Significantly higher TP and TSP loads in surface runoff were associated with surface applications of manure immediately followed by a precipitation event. For the standard 12-cm, 60-minute event, TP and TSP loads were as high as 13.4 and 7.7 kg/ha, respectively. These loads were 20-25 times greater than observed TP, TSP loads from control plots.

Keywords: *Phosphorous, *Agricultural runoff, *Cultivation, *Manure, *Lake Ontario, Nonpoint sources, New York, Farm wastes, Field tests, Nitrogen, Surface runoff.

PB93-128049/REB PC **A05**/MF **A01**
Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.
Effects of No-Till and Fall Plowing on Pesticide Movement in Runoff and Tile Drainage. Final rept. 1987-89.
Ohio State Univ., Columbus. Dept. of Agronomy.
T. J. Logan, D. J. Eckert, B. Harrison, D. Beak, and J. Adewumni. Dec 89, 94p EPA/905/9-91/013, , GL-014/91
Grant EPA-R005970-01
Sponsored by Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

The present study examines the effects of no-till versus fall moldboard plowing in a corn-soybean rotation on losses in surface runoff and tile drainage of four of the most widely used herbicides: atrazine, alachlor, metolachlor and metribuzin. The study is being conducted on an experimental site in which runoff and tile drainage water quality have been continuously monitored for 15 years. The results for 1987-1989 are presented. Losses in runoff and tile drainage of the four herbicides were in the order: atrazine > alachlor > metolachlor > metribuzin.

Keywords: *Cultivation, *Agricultural runoff, *Soil conservation, *Herbicides, *Water quality control, Drainage, Monitoring, Agricultural chemicals, Surface runoff, Pesticides, Soil management, Statistical data.

PB93-128056/REB PC **A03**/MF **A01**
Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.
Northeast Indiana Conservation Tillage Demonstration Project. Final Report (1981-1985).
Allen County Soil and Water Conservation District, Fort Wayne, IN.
G. Lake. Feb 91, 30p EPA/905/9-91/001, , GL-05/91
Grant EPA-S005698
Sponsored by Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

The Northeast Indiana Conservation Tillage Project (NEICT) was established to properly demonstrate no-till and ridge till technology in the Indiana portion of the Maumee River Basin, to provide agronomy specialists to assist in pesticide and fertilizer changes to match the needs of the new farming practices, and to evaluate the effectiveness of an accelerated conservation tillage program in improving water quality, and cost of production for no-till compared to conventional tillage methods.

Keywords: *Soil conservation, *Cultivation, *Water quality control, Farm management, Land management, Soil management, Statistical data, Indiana, *Northeast Region(Indiana), *Conservation Tillage Demonstration Project, Amish.

PB93-128064/REB PC **A03**/MF **A01**
Overview of Strategic Planning at the Environmental Protection Agency.
Environmental Protection Agency, Washington, DC. Office of Planning and Evaluation.
26 Jun 90, 33p EPA/230/R-92/004

Strategic planning is: A clear and simple vision of what EPA is striving to accomplish; Choices about what EPA will and will not do, and choices regarding purpose and activities. The goal of strategic planning is to improve the way EPA--from existing programs to new initiatives, and from headquarters to regional offices--does its job.

Keywords: *Environmental management, *Project planning, *US EPA, Objectives, Regional planning, Government agencies, Budgeting, Allocations, Decision making, Cost effectiveness, *Strategic planning, Priorities.

PB93-128072/REB PC **A03**/MF **A01**
Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

Use of the Black Creek Database to Analyze Techniques for Estimating Nonpoint Source Loadings from Small Watersheds (May 1988). Final rept. 1975-81.
Purdue Univ., Lafayette, IN.
J. B. Morrison. Feb 91, 24p EPA/905/9-91/011, , GL-012-91
Sponsored by Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

The report describes an intensive use of the database developed during the Black Creek Project to analyze various monitoring methods applied to small watersheds. It is assumed that the primary reason for monitoring in these cases is an attempt to monitor the effectiveness of various strategies for control of nonpoint source pollution. Water quality data was collected at 16 sites within Black Creek. For purposes of the analysis described in this report, only two of these sites were considered, Sites 2 and 6. Although this report uses the Black Creek Database, loadings reported should not, in all cases, be considered official project results, since some manipulation of data was done to create a variety of sampling scenarios. Effort has been made to make it clear which data is theoretical and which is actual in this report.

Keywords: *Nonpoint sources, *Watersheds, *Water pollution sampling, *Water pollution control, Black Creek, Water quality data, Sediments, Site surveys, Data collection, Study estimates, Data base management, Concentration(Composition), Land use, Agricultural products, *Black Creek Watershed Project.

PB93-128080/REB PC **A12**/MF **A03**
Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.
Phytoplankton and Zooplankton in Lakes Erie, Huron, and Michigan: 1985. Volume 1. Interpretive Report. Final rept.
State Univ. of New York Coll. at Brockport. Dept. of Biological Sciences.
J. C. Makarewicz, P. E. Bertram, and T. Lewis. Dec 89, 272p EPA/905/3-90/003, , GLNPO-01/91
See also PB90-145822 and PB88-217062. Sponsored by Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

During the spring, summer and autumn of 1985, the structure of the phytoplankton and zooplankton communities in the offshore waters of Lake Michigan, Lake Huron and Lake Erie was monitored. In Lake Michigan, the presence of an oligotrophic rotifer association and the oligotrophic crustacean indicator species Diaptomus sicilis and Limnocalanus macrurus, the predominance of mesotrophic diatom species, and the abundance and biomass of plankton between that of Lake Huron and Lake Erie suggest that the offshore waters are currently in the oligotrophic-mesotrophic range. In Lake Huron, the presence of an oligotrophic rotifer assemblage, the domination of the calanoid copepods, the abundance of the oligotrophic Diaptomus sicilis, and relatively low zooplankton abundance suggest that the offshore waters continue to be oligotrophic. In Lake Erie, phytoplankton and zooplankton species composition and biomass suggest a more productive status than Lake Michigan and Lake Huron. Data support the classification of the Western Basin as mesoeutrophic, the Central Basin as mesotrophic and the Eastern Basin as oligo-mesotrophic.

Keywords: *Plankton, *Lake Erie, *Lake Michigan, *Lake Huron, *Limnology, *Aquatic ecosystems, *Biological communities, *Water pollution, *Eutrophication, Monitoring, Indicator species, Phytoplankton, Zooplankton, Great Lakes, Species diversity, Biomass, Abundance, Statistical data.

PB93-128098/REB PC **A10**/MF **A03**
Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.
Maumee River Basin Pilot Watershed Study. Volume 5. Continued Watershed Monitoring (1981-1985) and Rainulator Study - Detailed Data (1986). Final rept. 1981-84.
Defiance Soil and Water Conservation District, OH.
T. J. Logan. Sep 87, 209p EPA/905/9-91/008, , GL-09B/91
Grant EPA-R-005774-01
Portions of this document are not fully legible. Prepared in cooperation with Ohio State Univ., Columbus. Sponsored by Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

The work was begun in 1975 as one of several studies of U.S. and Canadian watersheds draining to the Great Lakes. The Maumee River Basin is the largest of the Great Lakes watersheds and contributes the highest loads of sediments and nutrients. The study was to monitor sediment and nutrient losses from several small watersheds in the Maumee River Basin. The tillage method studied was fall moldboard or fall chisel plowing. No-till and No-till ridges were also examined. The watershed studies were supplemented with a detailed examination of the effects or residue cover on soil and phosphorus losses using the programmable rainfall simulator of the National Soil Erosion Laboratory at Purdue University.

Keywords: *Watersheds, *Maumee River Basin, *Rainfall - runoff relationships, *Water pollution control, United States, Canada, Tables(Data), Great Lakes, Rainfall, Water quality, Rain gages.

PB93-128106/REB PC **A04**/MF **A01**
Pollution Prevention: Meeting the Environmental Challenges of the 1990s. Region 5 FY 91 Accomplishments.
Environmental Protection Agency, Chicago, IL. Region V.
Nov 91, 75p EPA/905/9-91/021

Passage of the Pollution Prevention Act of 1990, mandating development of a nationwide pollution prevention strategy, occurred simultaneously with increased pollution prevention awareness across Region 5 program activities. The Act established a hierarchy for environmental management with source reduction as the preferred strategy, and with recycling, pollution control and treatment, and waste disposal, following in descending order. As pollution prevention is rapidly becoming an integral part of Agency programs, source reduction and recycling approaches are being utilized throughout the Region, within and across media.

Keywords: *Environmental management, *Pollution prevention, Pollution control, Recycling, Waste treatment, Waste disposal, Risk, Reduction, Ranking, Regional planning, Pollution Prevention Act of 1990, Ecosystems.

PB93-128114/REB PC **A04**/MF **A01**
Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.
Otter Creek Watershed Conservation Tillage Demonstration Project (October 1987). Final rept. 1982-86.
Monroe County Soil and Water Conservation District, MI.
M. Smith, and K. F. Pielsticker. Oct 87, 64p GLNPO-08/91, EPA/905/9-91/007
Sponsored by Environmental Protection Agency, Chicago, IL. Great Lakes National Program Office.

The demonstration project was to evaluate the effectiveness of conservation tillage for controlling soil erosion and thus preventing the runoff of soil and nutrients into Lake Erie. It was designed to demonstrate to farmers the successful application of conservation tillage by other farmers in their community. The Soil and Water Conservation District and Soil Conservation Service provided the technical assistance to demonstrate the tillage practice.

Keywords: *Cultivation, *Soil conservation, *Demonstration watersheds, *Land management, Lake Erie, Michigan, Soil erosion, Pesticides, Water pollution control, Performance, Agricultural runoff, Fertilizers, Tables(Data), *Otter Creek Watershed, Monroe County(Michigan).

PB93-128122/REB PC **A06**/MF **A02**
State Sludge Management Program Guidance Manual.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
20 Dec 90, 108p

The manual has two purposes. First, it provides guidance to State personnel for assembling a State sludge program application. Second, it specifies the procedures by which the U.S. Environmental Protection Agency (EPA) will evaluate the State sludge program application. The manual is intended to provide guidance to both State and Federal personnel who are either preparing or evaluating the State sludge program application.

Keywords: *Sludge disposal, *State government, Manuals, Program management, Legislation, Requirements, Statutes, Regional, Municipalities, Evaluation.

PB93-129724/REB PC **A05**/MF **A01**
Enforcement Four-Year Strategic Plan: Enhanced Environmental Enforcement for the 1990's.
Environmental Protection Agency, Washington, DC. Office of Enforcement.
Feb 91, 81p EPA/OE/LE-133

A strong enforcement program is one of the highest priorities for the Environmental Protection Agency (EPA). Aggressive enforcement is the key to effective EPA, State, local and international programs and a clean environment. As the regulatory responsibilities grow, EPA must maintain an enforcement program that will protect human health and the environment, as well as promote pollution prevention and waste minimization on the part of the regulated community. As part of the Agency-wide strategic planning process, EPA directed the Office of Enforcement to develop a comprehensive enforcement plan with both media-specific (i.e., air, water, toxics, etc.) and cross-media components. The Enforcement Four-Year Strategic Plan outlines the capabilities which will be needed to enhance enforcement efforts for the future. Several are now being implemented on a pilot basis, while others will be fully developed over the next several years.

Keywords: *Law enforcement, *US EPA, *Environmental protection, *Pollution abatement, *Government policies, Pollution regulations, Environmental policy, State government, Local government, Forecasting, Pollution laws, Waste minimization.

PB93-129732/REB PC **A08**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
Handbook: Ground Water. Volume 1. Ground Water and Contamination.
Eastern Research Group, Inc., Arlington, MA.
M. J. Barcelona, R. Boulding, R. C. Heath, J. Keely, and W. A. Pettyjohn. Sep 90, 152p EPA/625/6-90/016A
Prepared in cooperation with Western Michigan Univ., Kalamazoo, and Oklahoma State Univ., Stillwater. Sponsored by Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.

The subsurface environment of ground water is characterized by a complex interplay of physical, geochemical and biological forces that govern the release, transport and fate of a variety of chemical substances. The impact of natural ground-water recharge and discharge processes on distributions of chemical constituents is understood for only a few types of chemical species. Also, these processes may be modified by both natural phenomena and man's activities so as to further complicate apparent spatial or temporal trends in water quality. A purpose of the document is to discuss measures that can be taken to ensure that uncertainties do not undermine the ability to make reliable predictions about the response of contamination to various corrective or preventive measures. The need exists for a resource document that brings together available technical information in a form convenient for ground-water personnel within EPA and state and local governments on whom EPA ultimately depends for proper ground-water management. The information contained in the handbook is intended to meet that need. It is applicable to many programs that deal with the ground-water resource. However, it is not intended as a guidance or support document for a specific regulatory program.

Keywords: *Handbooks, *Ground water, *Water pollution abatement, *Water management, *Water quality, *Chemical compounds, Environmental transport, Recharge, Discharge(Water), Regional analysis, Hydrogeology, Hydrology, Subsurface investigations, Remedial action, Geological surveys.

PB93-129740/REB PC **A07**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
Handbook: Ground Water. Volume 2. Methodology.
Eastern Research Group, Inc., Arlington, MA.

M. J. Barcelona, R. Boulding, R. C. Heath, W. A. Pettyjohn, and R. Sims. Jul 91, 141p EPA/625/6-90/016B
Prepared in cooperation with Western Michigan Univ., Kalamazoo, and Oklahoma State Univ., Stillwater. Sponsored by Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information, and Utah State Univ., Logan.

The subsurface environment of ground water is characterized by a complex interplay of physical, geochemical and biological forces that govern the release, transport and fate of a variety of chemical substances. The impact of natural ground-water recharge and discharge processes on distributions of chemical constituents is understood for only a few types of chemical species. A purpose of the document is to discuss measures that can be taken to ensure that uncertainties do not undermine the ability to make reliable predictions about the response of contamination to various corrective or preventive measures. The need exists for a resource document that brings together available technical information in a form convenient for ground-water personnel within EPA and state and local governments on whom EPA ultimately depends for proper ground-water management. Volume II, Methodology describes various investigative approaches and techniques. Although extensively revised, part of Volume II was obtained from previous publications.

Keywords: *Methodology, *Ground water, *Handbooks, *Water pollution sampling, *Water quality, *Water management, Observation wells, Sampling, Environmental transport, Subsurface investigations, Tracer studies, Aquifers, Mathematical models, Computerized simulation, Design.

PB93-130086/REB PC **A03**/MF **A01**
Successful Practices in Title III Implementation. Chemical Emergency Preparedness and Prevention Technical Assistance Bulletin. Cameron County, Texas; Bucks County, Pennsylvania; Harford County, Maryland; Dallas County, Texas. Series 6, Number 7.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Feb 91, 26p OSWER-91-006.1
Also available from Supt. of Docs. See also PB93-126126.

This is another in a series of bulletins EPA is issuing to provide examples of implementation programs and strategies of the Emergency Planning and Community Right-to-Know Act of 1986, known as Title III, that are innovative or have proven effective. The purpose of these bulletins is to share information on successful practices with Local Emergency Planning Committees (LEPCs), State Emergency Response Commissions (SERCs), fire departments, and other Title III implementing agencies throughout the country in the hope that such information will prove useful to other SERCs and LEPCs as their programs develop and evolve. The bulletin discusses Title III implementation for Cameron County in Texas, Bucks County in Pennsylvania, Harford County in Maryland, and Dallas County in Texas.

Keywords: *Emergency planning, *Environmental protection, *Pollution regulations, *Technical assistance, *Chemical compounds, Implementation, Compliance, Funding, Training, Industrial wastes, Comprehensive planning, Risk assessment, Chemical spills, *Emergency Planning and Community Right-to-Know Act, Cameron County(Texas), Bucks County(Pennsylvania), Harford County(Maryland), Dallas County(Texas).

PB93-130094/REB PC **A05**/MF **A01**
U.S. Environmental Protection Agency Advisory Committees Charters, Rosters and Accomplishments.
Environmental Protection Agency, Washington, DC. Management and Organization Div.
Apr 91, 84p EPA-21M-1013
Also available from Supt. of Docs.

In the report, the Science Advisory Board offers a new assessment of environmental problems, based on the comparative risks posed by these problems. The Board further calls for innovative, integrated policies to effectively and efficiently reduce the most serious risks. With its emphasis on preventing pollution before it becomes a problem, on market incentives, on educating, on cooperation among EPA, other agencies, and other sectors of society, reducing risk is already guiding much of what the authors do here at EPA. The advisory committees give sound advice and provides fresh, independent perspectives on business matters at EPA. The five new advisory committees for the year are: The Acid Rain Advisory Committee; The Clean Air Act Advisory Committee; The Environmental Financial Advisory Board; The Lead Acid Battery Recycling Negotiated Rulemaking Advisory Committee; and The Reformulated Gasoline Rule and Oxygenated Gasoline – Marketable Oxygen Credit Program Guidelines and Labeling Regulations Negotiated Rulemaking Advisory Committee.

Keywords: *Environmental protection, *Pollution abatement, *US EPA, *Advisory committees, Administrative procedures, Environmental impact assessments, Acid rain, Clean Air Act, Lead-acid batteries, Pollution regulations, Waste recycling, Gasoline.

PB93-130383 Not available NTIS
Environmental Protection Agency, Washington, DC.
Simplified Cycle Simulation Model for the Performance Rating of Refrigerants and Refrigerant Mixtures. Final rept.
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Building Environment Div.
P. A. Domanski, and M. O. McLinden. 1990, 10p
Sponsored by Environmental Protection Agency, Washington, DC., and Electric Power Research Inst., Palo Alto, CA.
Pub. in ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers)-Purdue CFC Conference, West Lafayette, IN., July 17-20, 1990, 10p.

A simulation program, CYCLE11, which is useful for the preliminary evaluation of the performance of refrigerants mixtures in the vapor compression cycle is described. The program simulates a theoretical vapor-compression cycle and departures from the theoretical cycle as occur in a heat pump and in a refrigerator. The cycles are prescribed in terms of the temperatures of the external heat transfer fluids with the heat exchangers generalized by their average effective temperature differences. The isenthalpic expansion process is assumed. The program includes a rudimentary model of a compressor and a representation of the suction line and liquid line heat exchange. Refrigerant thermodynamic properties are calculated using the Carnahan-Starling-DeSantes equation-of-state. Refrigerant transport properties are not included in the simulations. The program can generate merit ratings of refrigerants for which limited measurement data are available. An example of simulation results stresses the need for careful application of simplified models and consideration for the involved assumptions.

Keywords: *Refrigerants, *Thermodynamic cycles, *Cooling systems, *Computerized simulation, Mixtures, Thermodynamic properties, Compressible flow, Heat exchangers, Refrigerating machinery, Refrigerant compressors, Mathematical models, Heat transfer, Reprints.

PB93-130441/REB PC **A03**/MF **A01**
Pesticide Fact Sheet Number 236: Pyridate.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
23 Oct 92, 17p EPA/540/FS-93/236

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on pyridate. A Fact Sheet was issued because of registration of a new chemical.

Keywords: *Pesticides, *Toxic substances, Herbicides, Regulations, Sulfur organic compounds, Chemical properties, Toxicity, Ecology, Labels, Agricultural products, Laboratory animals, *Chemical Information Fact Sheet, *Registration, *Pyridate, Tough, Carbonothioate/(chloro-phenyl-pyridazinyl)-S-octyl, Use patterns, Science findings, CAS 55512-33-9.

PB93-131191/REB PC **A03**/MF **A01**
Analysis of Commercial Nitric Oxide Protocol Gases: A Quality Assurance Audit.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
A. P. Hines. Oct 92, 12p EPA/600/R-92/225

EPA has initiated a national QA program on the suppliers of Protocol Gases. In this program, which will operate continuously, Protocol Gases are obtained and analyzed by EPA. The results of this EPA analysis are then compared to the Certificate of Analysis supplied with the Protocol Gas. Reported here is a comparison between the results obtained by EPA on eight Protocol-2 Gases containing approximately 40 ppm of NO in nitrogen and the concentrations provided by the suppliers of the Protocol Gases. EPA's and the suppliers' values agreed within 2% for seven of the eight Protocol-2 Gases; the eighth differed by 2.5%.

Keywords: *Nitrogen oxide(NO), *Quality assurance, *Air pollution monitors, *Gas analysis, *Supplying, Certification, Quality control, Gas cylinders, Performance standards, Regulations, US EPA, Air samplers, Calibrating, *Protocol Gases, *Standard reference materials, Atmospheric Research and Exposure Assessment Laboratory.

PB93-131209/REB PC **A08**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Source Methods Research Branch.
Guidelines for Mercury Measurements from Stationary Sources: Quality Assurance Handbook. Section 3.19. Volume 3. Handbook.
Research Triangle Inst., Research Triangle Park, NC.
F. Wilshire, P. Grohse, and B. DeWees. Dec 92, 151p EPA/600/R-92/234
Contract EPA-68-D1-0009
See also PB91-233361. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Source Methods Research Branch.

The report includes Method 101A (M101A) which is similar to Method 101 for the determination of mercury (Hg) from stationary sources. In M101A, however, acidic potassium permanganate solution is used for sample collection instead of acidic iodine monochloride solution. The method applies to the determination of particulate and gaseous mercury emissions from sewage sludge incinerators and other sources (as specified in the regulations). Particulate and gaseous Hg emissions are withdrawn isokinetically from the source and collected in acidic potassium permanganate solution. The collected Hg (in mercuric form) is reduced to elemental Hg, which is then aerated from the solution into an optical cell and measured by atomic absorption spectrophotometry. After initial dilution, the range of the method is 20 to 800 ng Hg/ml. The upper limit can be extended by further dilution of the sample. The sensitivity of the method depends on the recorder/spectrophotometer combination selected.

Keywords: *Vapors, *Measurement, *Mercury(Metal), Tests, Gases, Aeration, Spectrophotometry, Incinerators, Potassium permanganate, Sampling, Ammonia, Hydrogen chloride, Agent, Recovery, Stationary sources, Particulates.

PB93-131217/REB PC **A23**/MF **A04**
Pathobiology of Marine and Estuarine Organisms.
Environmental Research Lab., Gulf Breeze, FL.
J. A. Couch, and J. W. Fournie. Dec 92, 541p EPA/600/R-92/232, CONTRIB-751
See also PB88-251665.

The book is an up-to-date compendium of scientific findings related to diseases of marine and estuarine organisms. The information was presented at the Gulf Breeze Symposium on Marine and Estuarine Disease Research sponsored by the U.S. Environmental Protection Agency (EPA) Environmental Monitoring and Assessment Program (EMAP) held in October 1990 on Pensacola Beach, Florida. Authors review the state-of-the-science and recommend research for future studies of the impact of xenobiotics and other anthropogenic stress factors on disease processes in marine and estuarine organisms.

Keywords: *Marine biology, *Estuaries, *Diseases, Mammals, Marine fishes, Mollusca, Invertebrates, Water pollution effects(Animals), Immunity, Fungus diseases, Pathology, Crustacea, Parasitic diseases, Bacterial diseases, *Pathobiology.

PB93-131506/REB PC **A15**/MF **A03**
Office of Radiation Programs, Washington, DC.

Laboratory Testing of Commercially Available Power Frequency Magnetic Field Survey Meters. Final rept.
SC and A, Inc., McLean, VA.
30 Sep 91, 327p EPA/400/R-92/010
Prepared in cooperation with Science Applications International Corp., McLean, VA. Sponsored by Office of Radiation Programs, Washington, DC.

Exposure to magnetic fields related to electrical power equipment has been implicated as a risk to the public. Many commercially available instruments may be used by the public to survey these fields in the environment. This report gives the results of a testing effort designed to determine the characteristics of these commercially available magnetic field survey meters. The devices tested were limited to coil type single axis meters having either analog or digital readout. Excluded from this test were computer driven devices, multi-axis devices, and devices utilizing non-coil type sensing probes. All manufacturers known to the EPA at the time of the test were solicited to submit their meters for testing. Each manufacturer was requested to submit two items of each type. In addition, several instruments were purchased from manufacturers. The test results show a broad range of meter characteristics and should be helpful for evaluation of a meter for various different applications.

Keywords: Commercial equipment, Electrical equipment, Power equipment, Performance evaluation, Laboratory tests, Survey monitors, Hz range, Sensitivity, Accuracy, *Magnetic field meters.

PB93-131548/REB PC A03/MF A01
Comparing the Accuracy of Equation Formats for Modeling Microbial Population Decay Rates. Book chapter.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
C. J. Hurst, D. K. Wild, and R. M. Clark. 1992, 29p EPA/600/A-92/260
Pub. in Book Modeling the Metabolic and Physiologic Activities of Microorganisms, Chapter 6, p149-175. Prepared in cooperation with National Inst. for Occupational Safety and Health, Rockville, MD.

Virus stability in natural environments is important to understanding the health significance of human or animal viral contaminants in air, soil, and water. It is also a consideration in studies on the role of natural virus populations in plant and microbial ecology. There are no standard formats for modeling environmental virus stability. The present study was intended to help fill this void by comparing the relative accuracy of four regression formats for empirically modeling viral stability using a database on picornavirus survival in surface freshwaters. Greatest accuracy was achieved by multiplicative error regression using survival ratio as dependent variable.

Keywords: *Microbiology, *Microbial colony count, Soil microbiology, Aquatic microbiology, Air, Plants(Botany), Ecology, Mathematical models, Reprints.

PB93-131605/REB PC A03/MF A01
Dry Flue Gas Cleaning Processes for Achieving Air Pollutant Emissions Requirements. Rept. for Jul-Aug 91.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
T. G. Brna. 1992, 17p EPA/600/A-92/266
Presented at ASME's National Waste Processing Conference and Exhibit (15th), Detroit, MI., May 17-20, 1992. See also PB87-206108, PB89-172167 and PB91-146696.

The paper discusses both municipal waste combustor (MWC) rules and basic dry flue gas cleaning (FGC) processes, and compares the performance of the latter using field test data. Methods to supplement dry FGC processes for improving the control of mercury and organics are addressed. Dry FGC processes can meet requirements for regulated air pollutants from MWCs: acid gas, trace organic, trace heavy metal, and particulate emissions. Rules for controlling these and nitrogen oxide emissions from MWCs with a capacity over 225 tons/day were published by the U.S. EPA in early 1991 in compliance with the Clean Air Act Amendments (CAAA) of 1990.

Keywords: *Flue gases, *Air pollution control, *Standards, *Municipalities, Organic compounds, Combustion products, Nitrogen oxides, Cadmium, Lead(Metal), Cleaning, Emissions, Reduction, Requirements, Particulates.

PB93-131647/REB PC A02/MF A01
Gas Research Inst., Chicago, IL.
Analysis of IAQ Control Options and the Effects of Sources and Sinks.
Sonotech, Atlanta, GA.
L. E. Sparks. 1991, 9p EPA/600/A-92/270
Presented at 1991 ASHRAE IAQ Meeting, Washington, DC., September 2-5, 1991. See also PB91-201095. Sponsored by Gas Research Inst., Chicago, IL., and Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results of an analysis of indoor air quality (IAQ) control options, with emphasis on the interactions between IAQ control options and source and sink characteristics. Indoor air pollution has become an important environmental problem. It is generally recognized that IAQ in many buildings needs to be improved. Options for improving IAQ include increased ventilation, more effective use of ventilation, use of air cleaners, elimination of sources, and modification of sources.

Keywords: *Indoor air pollution, *Air quality, *Air pollution control, *Buildings, *Pollution sources, Ventilation, Air cleaners, Revisions, Adsorbers(Materials), Environmental engineering.

PB93-131662/REB PC A03/MF A01
Design of New Schools and Other Large Buildings Which Are Radon Resistant and Easy to Mitigate. Rept. for Sep 90-Aug 91.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
A. B. Craig, K. W. Leovic, and D. B. Harris. 1992, 11p EPA/600/A-92/272
Presented at International Symposium on the Natural Radiation Environment (5th), Salzburg, Austria, September 22-28, 1991. See also PB91-233254 and PB92-121268.

The paper discusses the recent incorporation of radon mitigation design recommendations in the construction of a hospital in Johnson City, TN. The recommendations resulted in the mitigation of a 5,500 square meter building with only one suction point at an incremental cost of $1.03 per square meter. Extrapolation of the pressure field extension (PFE) measurements indicates that a much larger building could have been mitigated with the system used. A search is underway for larger buildings to be built in radon prone areas of the U.S. in order to determine the effectiveness of the mitigation system in reducing radon in even larger buildings. As a prelude to the preparation of a new construction technical guidance document for schools, architectural drawings of all schools research by EPA, to date, were carefully studied to determine which building characteristics affect radon entry and ease of mitigation. Results of the study were presented at an international symposium on radon in Philadelphia, PA, in April 1991.

Keywords: *Mitigation, *Radon, *Pollution control, Design criteria, Hospitals, Building codes, Schools, Construction, Reduction, Cost analysis, Architecture, Drawings, Stationary sources, Mitigation systems.

PB93-131746/REB PC A02/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Hydraulic Conductivity of Three Geosynthetic Clay Liners. Journal article.
Hart-Crower Associates, Seattle, WA.
P. Estornell, and D. E. Daniel. c1992, 10p EPA/600/J-92/392
Grant R-815546
Pub. in Jnl. of Geotechnical Engineering, v118 n10 p1592-1606 Oct 92. See also PB91-141846. Prepared in cooperation with Texas Univ. at Austin. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The hydraulic conductivity of three 2.9 sq m (32 sq ft) geosynthetic clay liners (GCLs) was measured. Tests were performed on individual sheets of the GCLs, on overlapped pieces of GCLs, and on composite liners consisting of a punctured geomembrane overlying a GCL. Hydraulic conductives of two of the GCLs were in the range of 10 to the minus 10 10 to the minus 8 cm/s. No flow was measured through the third GCL, but the conductivity was obviously very low. The hydraulic conductivities of overlapped GCLs were about the same as those of the control samples with no overlap; an effective hydraulic seal developed along the overlaps in all the materials tested. Performance of the punctured geomembrane-GCL composites varied--performance was best when the punctured geomembrane was placed directly against bentonite and no geotextile separated the punctured geomembrane from the bentonite. For those GCLs with geotextiles on both sides, problems with migration of bentonite into the underlying drainage layer were encountered when inadequate filtration was provided. However, with a suitable filtration layer separating the drainage layer from the GCL, problems with migration of bentonite were liminated.

Keywords: *Linings, *Hydraulic conductivity, *Earth fills, Bentonite, Waste storage, Solid waste disposal, Graphs(Charts), Tables(Data), Mestings, Remedial action.

PB93-131753/REB PC A02/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Constructed Wetland Design: the First Generation. Journal article.
Environmental Engineering Consultants, Norwich, VT.
S. C. Reed, and D. S. Brown. c1992, 8p EPA/600/J-92/394
Contract EPA-68-CO-0027
Pub. in Jnl. Water Environment Research, v64 n6 p776-781. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A recent inventory, sponsored by the U.S. EPA Risk Reduction Engineering Laboratory in Cincinnati, OH documented the presence of over 150 constructed wetlands systems in the U.S., for the treatment of municipal and industrial wastewaters. The total flow received by these systems is about 400,000 cu m/d (100 mgd). This paper summarizes some of the results from the inventory, including: location, type, vegetation, design flow, loading rates, and costs for wetland systems where this information was available. The paper also discusses some 'lessons learned' from site visits to several of the systems.

Keywords: *Sewage treatment, *Industrial treatment, *Water pollution control, Wetlands, United States, Performance evaluation, Design, Hydraulics, Cost analysis, Operations, *Created wetlands, *Wetland treatment systems, Small systems, Free water surface wetlands, Subsurface flow wetlands.

PB93-131761/REB PC A02/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Transmission Electron Microscope Observations of Airborne Asbestos Structures during the Removal of Vinyl Asbestos Tiles and Mastic Adhesive. Journal article.
IT Corp., Cincinnati, OH.
K. A. Brackett, P. J. Clark, and T. J. Powers. c1992, 9p EPA/600/J-92/395
Contract EPA-68-C9-0036
Pub. in Jnl. of Environmental Choices Technical Supplement, v1 p15-20 Jul/Aug 92. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A research project was conducted by the Department of the Army, Corps of Engineers, Tulsa District to determine potential release of asbestos during the removal of vinyl floor tiles (VAT) and mastic adhesive, both of which contained asbestos. Tests were conducted during July and August of 1990 in seven enclosed test areas constructed at Fort Sill, Lawton, Oklahoma. The observations presented were obtained by transmission electron microscopy (TEM) at the USEPA Risk Reduction Engineering Laboratory employing a modified AHERA analytical protocol.

Keywords: *Asbestos, *Air pollution detection, *Molecular structure, *Transmission electron microscopy, *Chemical analysis, Analytic techniques, Tiles, Adhesives, Indoor air pollution, Buildings, Concentration(Composition), Reprints, Protocols.

PB93-131787/REB PC **A02**/MF **A01**
Chemical Stabilization of Mixed Organic and Metal Compounds. EPA SITE Program Demonstration of the Silicate Technology Corporation Process. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
E. R. Bates, P. Dean, and E. Klich. c1992, 7p EPA/600/J-92/403
Pub. in Jnl. of the Air and Waste Management Association, v42 n5 p724-728 May 92.

In November 1990, the Silicate Technology Corporation's (STC) proprietary process for treating soil contaminated with toxic semivolatile organic and inorganic contaminants was evaluated in a Superfund Innovative Technology Evaluation (SITE) field demonstration at the Selma Pressure Treatment (SPT) wood preserving site in Selma, California. The SPT site was contaminated principally with pentachlorophenol (PCP) and arsenic, as well as lesser amounts of chromium and copper. Because of their importance when selecting a remedy for the site, PCP and arsenic were identified as critical analytes to evaluate the effectiveness of treatment. (Copyright (c) 1992 Air & Waste Management Association.)

Keywords: *Superfund, *Soil treatment, *Remedial action, *Wood preservatives, *Waste treatment, Organic compounds, Metal compounds, Arsenic, Land pollution control, US EPA, Hazardous materials, Immobilization, Analytic techniques, Stabilization, Reprints, *Innovative treatment technologies, Silicate Technology Corporation, Superfund Innovative Technology Evaluation Program, Selma(California), Phenol/pentachloro, Cleanup operations.

PB93-131803/REB PC **A03**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Performance of an Aquatic Multispecies System in Evaluating the Effects of a Model Microbial Pest Control Agent on Nontarget Organisms. Journal article.
Arizona Univ., Tucson. Dept. of Veterinary Sciences.
R. R. Williams, B. Dehdashti, and D. V. Lightner. c1992, 20p EPA/600/J-92/405
Pub. in Jnl. of Toxicology and Environmental Health, v37 p247-264 1992. See also PB-278 631. Prepared in cooperation with Veterans Administration Medical Center, Tucson, AZ. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

A recirculating multispecies test system was developed in conjunction with a study of the fate and persistence of a model microbial pest control agent on nontarget marine and freshwater organisms. The basic unit of the system was a 113-l glass aquarium with vertical biological filters in the center of the aquarium, such that two compartments were formed. This allowed the sequestration of predator and prey species within the same system. Organisms from six phyletic groups were subjected to a genetically altered strain of Pseudomonas putida for 15-29 d in either artificial seawater or fresh water. The system was able to maintain the animals for these periods with a minimum of maintenance. Additionally, the system design lent itself to disinfection, dismantling, and rebuilding between experiments with a minimum of labor, and has potential for longer-term studies. (Copyright (c) 1992 by Hemisphere Publishing Corporation.)

Keywords: *Aquatic biology, *Marine biology, *Biological pest control, *Pseudomonas putida, Survival, Species diversity, Sea water, Fresh water, Genetic engineering, Water quality, Parasites, Reprints.

PB93-131811/REB PC **A02**/MF **A01**
Effects of 'Beauveria bassiana' on Embryos of the Inland Silverside Fish ('Menidia beryllina').
Environmental Research Lab., Gulf Breeze, FL.
F. J. Genthner, and D. P. Middaugh. c1992, 8p EPA/600/J-92/406, CONTRIB-774
Pub. in Applied and Environmental Microbiology, v58 n9 p2840-2845 1992. See also PB91-167650.

A chemical toxicity/teratogenicity test was adapted to assess potential adverse effect of a microbial pest control agent on a nontarget fish. Developing embryos of inland silverside, Menidia beryllina, were exposed to conidiospores of the insect-pathogenic fungus, Beauveria bassiana. Adherence of spores to the chorion followed by germination and penetration by the germ tube caused the embryos to rupture, sometimes resulting in death. Conidiospores treated with a biological detergent showed significantly less binding ($p < or = 0.01$) to embryos than did untreated spores. Both detergent-treated and heat-killed spores failed to cause significant pathogenic responses.

Keywords: *Toxicity, *Marine fishes, *Microbiology, Embryos, Fungus diseases, Exposure, Spores, Germination, Mortality, Reprints, Beauveria bassiana, Fungi, Menidia beryllina, Silverside.

PB93-131852/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Effect of Sulfur Dioxide on the Formation Mechanism of Polychlorinated Dibenzodioxin and Dibenzofuran in Municipal Waste Combustors. Journal article.
Acurex Corp., Research Triangle Park, NC.
B. K. Gullett, K. R. Bruce, and L. O. Beach. c1992, 8p EPA/600/J-92/410
Contract EPA-68-DO-0141
Pub. in Environmental Science and Technology, v26 n10 p1938-1943 1992. See also PB89-239223. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results of an investigation of the effect of SO2 on the formation mechanism of polychlorinated dibenzodioxin (PCDD) and polychlorinated dibenzofuran (PCDF) in the post-combustion, downstream region (500 to 300 C) of a municipal waste combustor (MWC). Laboratory experiments simulating the flue gases and particle environment of an MWC examined PCDD production under varying conditions. Effects on the concentration of the organic-chlorinating constituent, Cl2, through both homogeneous reaction with SO2 and deactivation of a Cl2-forming catalyst, Cu(II), were examined. Experimental results suggest that the reaction of Cu(II) with SO2 to form CuSO4 renders the catalyst less active, decreasing PCDD formation by minor amounts. However, this inactivity is not the result of decreased Cl2 formation, but rather of reduced ability of Cu(II) to promote a second catalytic step of biaryl synthesis. These findings suggest that the apparent lack of PCDD and PCDF in the emissions from coal-fired combustors may be due to the relatively high concentrations of SO2. (Copyright (c) 1992 American Chemical Society.)

Keywords: *Polychlorinated dibenzodioxins, *Polychlorinated dibenzofurans, *Municipal wastes, *Waste disposal, *Air pollution abatement, *Combustors, Sulfur dioxide, Combustion products, Catalysts, Experimental design, Chlorine organic compounds, Chemical reactions, Combustion kinetics, Reprints, *Chemical reaction mechanisms.

PB93-131977/REB PC **A17**/MF **A04**
Environmental Protection Agency, Cincinnati, OH.
Proceedings: Interagency Symposium (2nd) on Stabilization of Soils and Other Materials. Held in Metairie, Louisiana on November 2-5, 1992.
Soil Conservation Service, Fort Worth, TX.
1992, 387p
Sponsored by Environmental Protection Agency, Cincinnati, OH., Federal Highway Administration, McLean, VA., Army Engineer Waterways Experiment Station, Vicksburg, MS., and Bureau of Reclamation, Denver, CO.

Technical sessions consisted of pavement and horizontal construction, in situ stabilization, geosynthetics/soil reinforcement systems, dams and water conveyance systems, erosion control waste management, waste/byproducts stabilization/utilization, and soil stabilization with contaminated soils. To encourage input from the large number of attendees, a special workshop format was used.

Keywords: *Meetings, *Soil stabilization, *Stabilization, *Waste management, *Construction materials, Construction, Pavements, Erosion control, Waste utilization, Soil contamination, Quality assurance, Quality control, Design, Roads, In-situ processing, Dams, Reinforcement, Field tests, Geosynthetic materials.

PB93-132637/REB PC **A05**/MF **A01**
Overview of Existing State Alternative Financing Programs: Financing Drinking Water System Capital Needs in the 1990's.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
May 92, 76p EPA/812/R-92/001

The report provides an overview of alternative financing programs in twelve states. These programs were designed to provide financial assistance to local entities for the construction, enhancement, and rehabilitation of drinking water treatment facilities as well as other state infrastructure needs. Each state outline includes information on the development of the program, their specific objectives, criteria fur funding projects, and a description on how each program has been implemented.

Keywords: *Water treatment plants, *State programs, *Financing, *Economic assistance, *Potable water, Reviews, Capitalized costs, Alternatives, Funding, State implementation plans, Loans, Grants.

PB93-135705/REB PC **A02**/MF **A01**
Sampling, Characterizing and Mapping Contaminated Sediments in River Harbors. Journal article.
Environmental Research Lab.-Duluth, MN.
V. E. Smith, J. E. Rathbun, and J. C. Filkins. c1992, 9p EPA/600/J-92/413
Pub. in Hazardous Materials Control, v5 n5 p22-28 Sep/Oct 92. See also PB92-231653 and PB88-251384.

The report discusses remedial actions at three major river harbors that required a comprehensive understanding of contaminated sediments. It describes an effort that included the development of a special work boat and the application of sampling and mapping techniques to provide the information.

Keywords: *Water pollution sampling, *Sediments, *Rivers, Harbors, United States, Sediment water interfaces, Industrial wastes, Urban areas, Aquatic biology, Public health, Comprehensive planning, Site characterization, Remedial action, Mapping, Reprints.

PB93-500007/REB CP **D03**
AutoMOUSE (Modular Oriented Uncertainty SystEm) - An Improvement to the MOUSE Computerized Uncertainty Analysis Program (for Microcomputers). Software.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
22 Jul 92, 2 diskettes* EPA/SW/DK-92/053
System: MS DOS based computer; MS DOS 3.x or later operating system, 512K. Language: FORTRAN/Assembly. Supersedes PB90-501370. MOUSE is written and based upon FORTRAN and therefore requires a FORTRAN Compiler as part of its system.
The software is on two 3 1/2 inch diskettes, 1.44 high density. File format: ASCII. Documentation included; may be ordered separately as PB93-100113.

The original MOUSE (Modular Oriented Uncertainty SystEm) system was designed to deal with the problem of uncertainties in Environmental engineering calculations, such as a set of engineering cost or risk analysis equations. It was especially intended for use by individuals with little or no knowledge of computer languages, programming, or simulation. The MOUSE system runs on MS-DOS based personal computers. It is easy and fast to learn and has all of the features needed for substantive uncertainty analysis, such as built-in probability distributions, plotting and graphing capabilities, sensitivity analysis, and interest functions for cost analyses. A series of unique companion utility programs help (1) analyze sample data to determine the probability distributions that best fit those data and (2) check each program for errors in syntax. AutoMOUSE is a significant improvement to the original MOUSE system. It actually writes the computer program necessary to carry out the uncertainty analysis. The input to AutoMOUSE consists of the equations of the model and requires no knowledge of computer programming. It is designed primarily for beginners but is also of value for those who have some programming experience and wish to construct MOUSE programs quicker and with fewer errors.

Keywords: *Software, *Environmental impact assessments, *Risk assessment, *Environmental engineering, Diskettes, Computerized simulation, Environmental health, Monte Carlo method, Stochastic processes, Revisions, Air pollution, Water pollution, Public health, Waste management, System analysis, Performance evaluation, *AutoMOUSE system, *Modular Oriented Uncertainty System.

PB93-500197/REB CP **T05**
Toxic Substances Control Act (TSCA) Chemical Substances Inventory: Revised Inventory Synonym and Preferred Name File, June 1992. Data file.
Environmental Protection Agency, Washington, DC.
Jun 92, mag tape* EPA/DF/MT-93/001
System: IBM 3081 K64; MVS-XA SP 2.2.3-DFP 3.1 operating system. File format: EBCDIC. Supersedes PB92-501386. See also PB86-220795 (Plantsite Information 1986) and PB86-220803 (Production Information 1986).
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 PB93-100261.

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 61,105 substances on the non-confidential Inventory file as of June 30, 1992. 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 the 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 survey, *Chemical compounds, Magnetic tapes, Free radicals, Polymers, Revisions, *Toxic Substances Control Act, *Chemical Substances Inventory, CAS Registry Number, Chemical nomenclature.

PB93-500239/REB CP **D03**
Industrial Source Complex LongTerm (ISCLT) (for Microcomputers). Software.
Environmental Protection Agency, Washington, DC. Office of Science and Technology.
Oct 92, 1 diskette EPA/SW/DK-93/005
System: IBM PC or compatible; MS DOS operating system. Language: FORTRAN. Data is in compressed format. Model contains executable files for microcomputer. Supersedes PB90-500380.
The software is on one 3 1/2 inch diskette, 1.44M high density. Documentation included; may be ordered separately as PB92-232446, PB92-232453, PB92-232461, and PB92-232479.

The model is a steady-state Gaussian plume model which can be used to assess pollutant concentrations from a wide variety of sources associated with an industrial source complex. The model can account for settling and dry deposition of particulates, downwash, area, line and volume sources, plume rise as a function of downwind distance, separation of point sources, and limited terrain adjustment. It is designed to calculate the average seasonal and/or annual ground level concentration or total deposition from multiple continuous point, volume and/or areas sources. Provision is made for special discrete, X, Y receptor points that may correspond to sampler sites, points of maxima, or special points or interest. Sources can be positioned anywhere relative to the grid system.

Keywords: *Software, *Air pollution, *Industrial waste, Plumes, Concentration(Composition), Particulates, Point sources, Sites, Air quality, Atmospheric diffusion, Long range(Time), Diskettes.

PB93-500247/REB CP **D02**
MESOPUFF (for Microcomputers). Model-Simulation.
Environmental Protection Agency, Research Triangle Park, NC.
Oct 92, 1 diskette EPA/SW/DK-93/006
System: IBM compatible; MS DOS operating system. Language: FORTRAN. Model contains executable files for microcomputer. Supersedes PB90-500794.
The software is on one 3 1/2 inch diskette, 1.44M high density. Documentation included; may be ordered separately as PB84-181775.

The model is a Lagrangian variable-trajectory puff superposition model suitable for modeling the transport, diffusion, and removal of air pollutants from multiple point and area sources at transport distances beyond the range of conventional straight-line Gaussian plume models (i.e. beyond 1-50).

Keywords: *Models-Simulation, *Software, *Air pollution, *Atmospheric diffusion, Transport properties, Contaminants, Meteorology, Air quality, Point sources, Plumes, Diskettes.

PB93-500254/REB CP **D02**
CALINE: California Line Source Model (for Microcomputers). Software.
Environmental Protection Agency, Washington, DC. Office of Science and Technology.
Oct 92, 1 diskette EPA/SW/DK-93/007
System: IBM PC or compatible; MS DOS operating system. Language: FORTRAN. Model contains executables files for microcomputer. Supersedes PB90-500299.
The software is on one 3 1/2 inch diskette, 1.44M high density. Documentation included; may be ordered separately as PB80-220841.

The model can be used to predict carbon monoxide concentrations near highways and arterial streets given traffic emissions, site geometry and meteorology. It has adjustments for averaging time and surface roughness, and can handle up to 20 links and 20 receptors. It also contains an algorithm for deposition and settling velocity so that particulate concentrations can be predicted.

Keywords: *Software, *Air pollution, *Carbon monoxide, *Concentration(Composition), Highways, Exhaust emissions, Dispersions, Air quality, Particulates, Sites, Meteorology, Algorithms, Diskettes.

PB93-500346/REB CP **D02**
PA-Score (Preliminary Assessment Score), Version 2.1, 5 1/4 inch (for Microcomputers). Software.
Environmental Protection Agency, Washington, DC. Hazardous Site Evaluation Div.
Oct 92, 1 diskette EPA/SW/DK-93/008
System: IBM PC or Compatible; MS DOS 3.0 operating system, 384K. Language: Compiled C. Supersedes PB92-500032. See also PB92-500024, PB91-507509, PB91-506964, PB90-502030, PB90-501487, PB89-186068, PB92-592001, PB91-591331, PB91-591311, and PB90-591781. Other formats available as 3 1/2 inch, 1.44 MB diskette, PB93-500353.
The software is on one (1) 5 1/4 inch diskettes, 1.2M high density. File format: ASCII. Documentation included; may be ordered separately as PB93-108322.

The PA-Score computer program has been developed to assist Superfund site assessment investigations in the Hazard Ranking System (HRS) at the Preliminary Assessment stage of site scoring. The Preliminary Assessment is used to assess the relative threat associated with actual or potential releases of hazardous substances to ground water, surface water, soil, and air. Version 2.1 is an update that resolves a programming error in the scoring of the resident population targets for soil exposure.

Keywords: *Software, *Superfund, *Waste disposal, *Hazardous materials, *Site surveys, Diskettes, Environmental impact assessments, Environmental transport, Water pollution, Land pollution, Air pollution, Exposure, Public health, *Hazard Ranking System, National Priorities List.

PB93-500353/REB CP **D02**
PA-Score (Preliminary Assessment Score), Version 2.1, 3 1/2 inch (for Microcomputers). Software.
Environmental Protection Agency, Washington, DC. Hazardous Site Evaluation Div.
Oct 92, 1 diskette EPA/SW/DK-93/009
System: IBM compatible; MS DOS operating system, 384K. Language: Compiled C. See also PB92-500024, PB91-507509, PB91-506964, PB90-502030, PB90-501487, PB89-186068, PB92-592001, PB91-591331, PB91-591311, and PB90-591781. Other formats available as 5 1/4 inch diskette, PB93-500346.
The software is on one 3 1/2 inch diskette, 1.44M high density. File format: ASCII. Documentation included; may be ordered separately as PB93-108322.

The PA-Score computer program has been developed to assist Superfund site assessment investigations in the Hazard Ranking System (HRS) at the Preliminary Assessment stage of site scoring. The Preliminary Assessment is used to assess the relative threat associated with actual or potential releases of hazardous substances to ground water, surface water, soil, and air. Version 2.1 is an update that resolves a programming error in the scoring of the resident population targets for soil exposure.

Keywords: *Software, *Superfund, *Waste disposal, *Hazardous materials, *Site surveys, Diskettes, Environmental impact assessments, Environmental transport, Water pollution, Land pollution, Air pollution, Exposure, Public health, *Hazard Ranking System, National Priorities List.

PB93-500478/REB CP **D01**
Preamble and Final Sludge Rule (for Microcomputers). Data file.
Environmental Protection Agency, Washington, DC. Office of Science and Technology.
7 Dec 92, 2 diskettes EPA/DF/DK-93/011
System: IBM compatible; MS DOS operating system. See also PB92-501816, PB92-501774, PB92-500024 and PB90-501834.
The datafile is on two 5 1/4 inch diskettes, 1.2M high density. File format: Word Perfect 5.1.

The Sewage Sludge Use and Disposal Regulation (40 CFR Part 503) sets national standards for pathogens and 10 heavy metals in sewage sludge. It also defines standards (or management practices) for the safe handling and use of sewage sludge. This rule is designed to protect human health and the environment when sewage sludge is beneficially applied to the land, placed in a surface disposal site, or incinerated. The rule was developed in accordance with the 1987 Amendments to the Clean Water Act.

Keywords: *Data file, *Sewage sludge, *Sludge disposal, *Regulations, Standards, Pathogens, Heavy metals, Sludge treatment, Sewage treatment, Incineration, Land disposal, Diskettes.

PB93-500577/REB CP **D06**
Oil and Hazardous Materials, Technical Assistance Data System (OHM-TADS) (for Microcomputers). Data file.
Environmental Protection Agency, Arlington, VA.
Jun 90, 7 diskettes EPA/DF/DK-93/010
System: IBM-compatible PC; MS DOS Version 3.0 or higher operating system, 40MB. Installation instructions are on each diskette. Type 'README' for instructions. The executible software provided allows the user to Add, Browse, Edit, Print, and perform various utility operations on the OHM-TADS files. See also PB92-501774, PB92-501972, PB92-503093, PB91-509935, PB92-501816, PB92-500024, PB91-59133
The datafile is on 7 5 1/4 inch diskettes, 1.2M high density. File format: CLIPPER. Documentation included; may be ordered separately as PB93-111706. Documentation is also on a diskette.

The Oil and Hazardous Materials, Technical Assistance Data System (OHM-TADS) is an automated information retrieval file specifically designed to facilitate rapid access to data on 1,402 oil and hazardous substances. OHM-TADS provides vital information to spill response team personnel, especially in emergency situations where readily accessible information on the degree of the hazards involved, appropriate countermeasures, and effective personnel safety precautions is of critical importance. Quantitative data and interpretative comments found in the 126 fields that constitute OHM-TADS can be used as a basis for decision making and initiation of corrective action for both on-scene coordinators and emergency response teams. Additionally, OHM-TADS covers regulatory information, including shipping requirements and water standards, as well as a wide variety of physical, chemical, biological, toxicological, and commercial data of value for enforcement and research activities. Sources of information presented in OHM-TADS include journal articles, symposia papers, government reports, and basic reference texts.

Keywords: *Data file, *Hazardous materials spills, *Oil spills, Diskettes, Law enforcement, Emergency planning, Land pollution control, Water pollution control, Physical properties, Chemical properties, Biological effects, Toxicology, Research.

PB93-780773/REB PC$182.00
Course 1. Model Curriculum for Training Asbestos Abatement Contractors and Supervisors (Training Manual).
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Apr 92, 1p
Package includes Student Notebook, PB93-780781, Instructor's Syllabus, PB93-780799, Purple Book, PB86-116522, Slides, PB93-780807, and Overheads, PB93-780815.

This 4-day course is intended for supervisors and may also be used for training designers of response actions. It covers in detail the work practices, abatement procedures, personal protection and relevant Federal regulations that a consultant or contractor must consider before beginning to design or supervise abatement work. Along with other topics, the course examines insurance, bonding, contract specifications, and the health effects of asbestos. The training course package contains a student notebook, instructor's course, syllabus, 466 slides, 40 overhead transparencies, and a copy of the 'Purple Book'.

Keywords: *Asbestos, *Pollution abatement, *Education, *Training devices, Curricula, Occupational safety and health, Contractors, Working conditions, Regulations, Insurance, Health hazards, Supervisors, Protective equipment, Asbestos Hazard Emergency Response Act.

PB93-780781/REB PC A21
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Model Curriculum for Training Asbestos Abatement Contractors and Supervisors. Student Notebook. Course 1 (Training Manual).
Georgia Tech Research Inst., Atlanta. Environment, Health and Safety Div.
Nov 88, 489p
Grant EPA-CX-814627-01-0
Sponsored by Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Also available as part of a Training Package, PB93-780773.

The manual was developed to provide guidance for those who are about to undertake an asbestos abatement project. The procedures and practices detailed in these pages incorporated current technology at the time of publishing. The reader should be reminded that as technology evolves, so do the methods for conducting asbestos abatement. Many of the recommended procedures discussed in this document go beyond the minimum requirements of the various regulations which have been promulgated by OSHA and EPA. This manual was prepared by professionals in the field of asbestos abatement and control. Throughout its preparation and upon completion, the manuscript was subjected to peer review in government, academic and industry circles.

Keywords: *Asbestos, *Pollution abatement, *Education, *Training devices, Manuals, Contractors, Procedures, Recommendations, Supervisors, Pollution regulations, Occupational safety and health, Student notebooks, Asbestos Hazard Emergency Response Act.

PB93-780799/REB PC A09
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Model Curriculum for Training Asbestos Abatement Contractors and Supervisors. Instructor's Course Syllabus. Course 1 (Training Manual).
Georgia Tech Research Inst., Atlanta. Environment, Health and Safety Div.
Nov 88, 176p
Grant EPA-CX-814627-01-0
Sponsored by Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Also available as part of a Training Package, PB93-780773.

This course is about currently available procedures and practices for asbestos removal projects. The discussion includes: background information on asbestos, health effects, and legal/insurance considerations; and a phase by phase explanation of how to set up and complete an asbestos abatement project.

Keywords: *Asbestos, *Pollution abatement, *Education, *Training devices, Manuals, Instructors, Contractors, Supervisors, Procedures, Health hazards, Public health, Legal aspects, Insurance, Occupational safety and health, Instructor course syllabus, Asbestos Hazard Emergency Response Act.

PB93-780823/REB PC$136.00
Course 2. Model Curriculum for School Building Inspectors (Training Manual).
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Apr 92, 1p
Package includes Student Notebook, PB93-780831, Instructor's Syllabus, PB93-780849, Purple Book, PB86-116522, Slides, PB93-780856, and Overheads, PB93-780864.

This 3-day course was developed in response to requirements of the AHERA regulations and is intended for school building inspectors. It covers such topics as health effects, legal liabilities, building systems, pre-inspection planning, bulk sampling, personal protection, and recordkeeping. The training course package contains a student notebook, instructor's course syllabus, 136 slides, 61 overhead transparencies, the '100 Questions about AHERA' document, the 'Local Education Agency (LEA) Guide', and a copy of the 'Purple Book'.

Keywords: *Pollution abatement, *Asbestos, *School buildings, *Inspection, *Training devices, *Education, Curricula, Occupational safety and health, Regulations, Legal aspects, Sampling, Biological effects, Protective equipment, Records management, Health hazards, School building inspectors, Asbestos Hazard Emergency Response Act.

PB93-780831/REB PC A17
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Model EPA Curriculum for Training Building Inspectors. Student Notebook. Course 2 (Training Manual).
Environmental Sciences, Inc., Tucson, AZ.
Jul 88, 384p
Prepared in cooperation with Georgia Tech Research Inst., Atlanta. Environment, Health and Safety Div. Sponsored by Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Also available as part of a Training Package, PB93-780823.

The course overview objectives are to know the requirements to become an accredited Management Planner under AHERA and to become familiar with the role of the Management Planner and where to find information regarding the topics covered in this notebook.

Keywords: *Asbestos, *Pollution abatement, *Buildings, *Inspection, *Training devices, *Education, Manuals, Requirements, Health hazards, Management planning, Managers, Student notebooks, Building inspectors, Asbestos Hazard Emergency Response Act.

PB93-780849/REB PC A07
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Model EPA Curriculum for Training Building Inspectors. Instructor's Course Syllabus. Course 2 (Training Manual).
Environmental Sciences, Inc., Tucson, AZ.
Jul 88, 129p
Prepared in cooperation with Georgia Tech Research Inst., Atlanta. Environment, Health and Safety Div. Sponsored by Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Also available as part of a Training Package, PB93-780823.

The course syllabus objectives are to become familiar with the history of asbestos uses; to recognize the characteristics and various types of asbestos; and to become acquainted with various types of asbestos containing materials (ACM) found in building applications.

Keywords: *Asbestos, *Pollution abatement, *Buildings, *Training devices, *Education, Manuals, Instructors, Construction materials, Instructor course syllabus, Building inspectors, Asbestos Hazard Emergency Response Act.

PB93-780872/REB PC$81.00
Course 3. Model Curriculum for School Asbestos Management Planners (Training Manual).
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Apr 92, 1p
Package includes Student Notebook, PB93-780880, Instructor's Syllabus, PB93-780898, Slides, PB93-780906, Overheads, PB93-780914, and Green Book, PB91-145920.

This 2-day course was developed in response to the requirements of the AHERA regulations and must be preceded by successful completion of the inspector's course. The course specifically prepares management planners to develop written plans for managing asbestos-containing materials in schools and for making recommendations to school officials for response actions. It examines methods for interpreting survey results, hazard assessment, evaluation and selecting control options, and assembling the management plan itself. The training course package contains a student notebook, instructor's course syllabus, 86 slides, 17 overhead transparencies, and a copy of the EPA 'Green Book' on operations and maintenance (O&M).

Keywords: *Asbestos, *School buildings, *Pollution abatement, *Management planning, *Education, *Training devices, Curricula, Construction materials, Materials handling, Regulations, Recommendations, Managers, Risk assessment, Health hazards, Occupational safety and health, Asbestos Hazard Emergency Response Act.

PB93-780880/REB PC A07
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Model EPA Curriculum for Training Management Planners. Student Notebook. Course 3 (Training Manual).
Environmental Sciences, Inc., Tucson, AZ.
Jul 88, 137p
Prepared in cooperation with Georgia Tech Research Inst., Atlanta. Environment, Health and Safety Div. Sponsored by Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Also available as part of a Training Package, PB93-780872.

The Asbestos Hazard Emergency Response Act (AHERA) Final Rule suggests certain minimum education prerequisites for Building Inspectors and Management Planners. To become an accredited Management Planner, persons must take the Building Inspector's course plus an additional 2-day approved training course. The course discusses the following objectives: to know the AHERA requirements for inspection reports and management plans; to understand the need for a systematic approach to review survey data and produce a summary; to be able to prepare and format survey data for use in hazard assessment; and to know the necessary records from the inspection report to include in the management plan.

Keywords: *Asbestos, *Pollution abatement, *Training devices, *Education, *Management planning, *Buildings, Inspection, Manuals, Construction materials, Operation and maintenance, Requirements, Managers, Environmental surveys, Risk assessment, Student notebooks, Building inspectors, Asbestos Hazard Emergency Response Act.

PB93-780898/REB PC A04
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Model EPA Curriculum for Training Management Planners. Instructor's Course Syllabus. Course 3 (Training Manual).
Environmental Sciences, Inc., Tucson, AZ.
Jul 88, 61p
Prepared in cooperation with Georgia Tech Research Inst., Atlanta. Environment, Health and Safety Div. Sponsored by Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Also available as part of a Training Package, PB93-780872.

The course objectives are to know the requirements to become an accredited Management Planner under AHERA and to become familiar with the role of the Management Planner and where to find information regarding the topics covered in this notebook.

Keywords: *Asbestos, *Pollution abatement, *Training devices, *Education, *Management planning, *Buildings, Managers, Instructors, Requirements, Inspection, Operation and maintenance, Risk assessment, Environmental surveys, Instructor course syllabus, Asbestos Hazard Emergency Response Act.

PB93-780922/REB PC$235.00
Course 4. Model Curriculum for Asbestos Abatement Workers (English Version) (Training Manual).
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Apr 92, 1p
Package includes Student Notebook, PB93-780930, Instructor's Syllabus, PB93-780948, Purple Book, PB86-116522, White Book, PB87-157574, Instructor's Resources, PB93-780955, and Slides, PB93-780963. Package also available in Spanish language, PB93-781003.

This three-day course is intended for those persons seeking accreditation as asbestos abatement workers. It presents a straightforward, easy-to-read approach to learning the basics of asbestos abatement, with illustrations and a summary of key facts and discussion questions at the conclusion of each chapter. It also includes a hands-on section designed to simulate actual on-the-job work practices. This training course package contains a student notebook, instructor's course syllabus, instructor's resources, 506 slides, a copy of the 'Purple Book', and a copy of 'A Guide to Respiratory Protection for the Asbestos Abatement Industry' (EPA/NIOSH). This course is also available in a Spanish language translation which includes a student notebook, slides, and a modified instructor's course syllabus.

Keywords: *Asbestos, *Pollution abatement, *Training devices, *Education, Personnel, Curricula, Occupational safety and health, Working conditions, Job analysis, Requirements, Protective equipment, Industrial safety, Health hazards, Asbestos Hazard Emergency Response Act.

PB93-780930/REB PC A14
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
EPA Model Asbestos Worker Training Manual. Course 4 (English Version).
Alice Hamilton Occupational Health Center, Washington, DC.
Nov 90, 303p
Grant EPA-CX-815849-01-0
Sponsored by Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Also available as part of a Training Package, PB93-780922.

Thirty to forty years ago, workers weren't told that asbestos is dangerous. They did not protect themselves when they were working. In this class, you will learn how to protect yourself. You will learn how to make your work with asbestos as safe as possible. This means safe for you, safe for your family, and safe for the environment. The goal of this class is to help you learn how to protect yourself.

Keywords: *Asbestos, *Pollution abatement, *Training devices, *Education, Personnel, Occupational safety and health, Industrial safety, Protective equipment, Working conditions, Manuals, Materials handling, Respirators, Health hazards, Student manuals, Asbestos Hazard Emergency Response Act.

PB93-780948/REB PC A15
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
EPA Model Asbestos Worker Training Course. Instructor's Manual. Course 4 (English Version) (Training Manual).
Alice Hamilton Occupational Health Center, Washington, DC.
Nov 90, 343p
Grant EPA-CX-815849-01-0
Sponsored by Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Also available as part of a Training Package, PB93-780922.

This is the manual for the instructor. It contains slides with notes; a variety of quizzes and discussion questions; games; skits; demonstrations; and detailed description of hands-on activities.

Keywords: *Asbestos, *Pollution abatement, *Training devices, *Education, Personnel, Instructors, Occupational safety and health, Industrial safety, Working conditions, Protective equipment, Health hazards, Instructor manuals, Asbestos Hazard Emergency Response Act.

PB93-780955/REB PC A09
EPA Model Asbestos Worker Training Instructor's Resources. Course 4 (English Version) (Training Manual).
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
1992, 188p
Also available as part of a Training Package, PB93-780922.

The report contains information pertaining to the course. It has reference information on exposure and protective equipment needed for the workers in the area of asbestos abatement.

Keywords: *Asbestos, *Pollution abatement, *Training devices, *Education, Personnel, Instructors, Health hazards, Occupational safety and health, Protective equipment, Respirators, Industrial safety, Instructional materials, Asbestos Hazard Emergency Response Act.

PB93-780971/REB PC$41.00
Course 5. Presentation to Accompany 'Guidance for Controlling Asbestos-Containing Materials in Buildings' (Training Manual).
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
1992, 1p
Package includes Slides, PB93-780989, Speaker Cards, PB93-780997, and Purple Book, PB86-116522.

This presentation was developed to describe the major aspects of EPA's main technical guidance document on asbestos, which is best known as the 'Purple Book'. It takes 1 to 1.5 hours to deliver and, when accompanied by information about asbestos materials in local school buildings, can be used to satisfy the 2-hour awareness training requirement of the Asbestos-Containing Material in Schools Rule, 40 CFR 763, Subpart E (763.92) of the AHERA regulations. The presentation materials include 56 slides, 17 speaker cards, and a copy of the 'Purple Book'.

Keywords: *Asbestos, *Pollution abatement, *Training devices, *Education, *School buildings, Construction materials, Requirements, Regulations, Occupational safety and health, Asbestos Hazard Emergency Response Act.

DE92019891/REB PC A03/MF A01
Measurements of electric and magnetic fields in the Waianae, Hawaii area.
National Air and Radiation Environmental Lab., Montgomery, AL.
E. D. Mantiply. Jul 92, 47p EPA-400R-92-009

During November 27–30, 1990, the US Environmental Protection Agency (EPA) conducted a measurement survey of electric and magnetic field levels along the southwest coast of Oahu, Hawaii. These measurements were requested by the State of Hawaii to determine the levels of radiofrequency (RF) electric and magnetic fields near Naval radio transmitters at Lualualei. The objective was to determine maximum fields in residential areas. This report documents the measurement results. Also, a few measurements were made of extremely-low-frequency (ELF) electric and magnetic fields at 60 hertz, the frequency used for electrical power.

Keywords: *Power Transmission Lines, *Antennas, *Electric Fields, Hawaii, *Magnetic Fields, Measuring Methods, Residential Buildings, Short Wave Radiation, Site Characterization, EDB/240500, *Hazards.

DE92563057/REB PC A03/MF A01
Wetlands and lakes as nitrogen traps. Research programme for the period 1 July 1990 - 30 June 1994.
National Environmental Protection Agency, Solna (Sweden).
M. Jansson, R. Andersson, J. Herrmann, and H. Berggren. 1991, 28p SNV-3963
Also available in Swedish as SNV--3962.

The research on nitrogen in wetlands and lakes described in this programme has two aims. Primarily the efforts is laid on investigating and developing the feasibility of optimizing various kinds of nitrogen retention in different kinds of wetlands and lakes in order to lower the nitrogen transport to the sea from agricultural areas. Another important objective is to get deeper knowledge about the nitrogen cycles and processes in limnetic systems. Also some studies on nitrogen retention in forest wetlands, as well as nature conservancy aspects, are included.

Keywords: *Denitrification, Aquatic Ecosystems, Eutrophication, *Lakes, Nitrogen Cycle, Research Programs, Sinks, Water Pollution, *Wetlands, *Foreign technology, EDB/540320, *Water pollution control.

DE92563058/REB PC A08/MF A02
Impact of fuels on diesel exhaust emissions. A chemical and biological characterization.
National Environmental Protection Agency, Solna (Sweden).
R. Westerholm, and K. E. Egebaeck. Sep 91, 158p SNV-3968

This report presents an investigation of the emissions from eight diesel fuels with different sulphur and aromatic content. A bus and a truck were used in the investigation. Chemical analysis and biological testing have been performed. The aim of this project was to find a 'good' diesel fuel which can be used in urban areas. Seven of the fuels were meant to be such fuels. It has been confirmed in this study that there exists a quantifiable relationship between the variables of the diesel fuel blends and the variables of the chemical emissions and their biological effects. 119 figs., 12 tabs., approx. 100 refs.

Keywords: *Diesel Engines, *Exhaust Gases, Aldehydes, Alkenes, Aromatics, Automotive Fuels, Bioassay, Carbon Dioxide, Carbon Monoxide, Chemical Analysis, Diesel Fuels, Dioxin, Emission, Experimental Data, Hydrocarbons, Nitrogen Oxides, Particulates, Tables(data), *Foreign technology, EDB/020900, *Air pollution abatement.

DE92563059/REB PC A04/MF A01
Measurements of total ozone. Progress rept.
National Environmental Protection Agency, Solna (Sweden).
W. Josefsson. 1991, 71p SNV-3944

The renewed concern about the ozone layer initiated a project of monitoring the total ozone in 1987. A Brewer ozone spectrophotometer at the Swedish Meteorological and Hydrological Institute (SMHI) in Norrkoeping and previously used for solar ultraviolet radiation measurements was repaired and recalibrated. It is now in regular operation since February 1988. This report summarizes the measurements and efforts during 1990. Changes in the observation schedules have been undertaken. The software was modified to improve measurements at low solar elevations, which are especially important during the winter season at high latitudes. Daily values of the valuable Dobson measurements from Uppsala during the period 1951 to 1966 have been processed and these are compared with more recent measurements in Norrkoeping. The effects of using different ways to compute average monthly values of an incomplete set of data are briefly discussed. The longterm variation of total ozone at these stations is presented. A new station has been established at Vindeln, in the northern part of Sweden, using the old Uppsala instrument, Dobson 30. Regular observations starts early 1991. 14 refs., 29 figs.

Keywords: *Ozone, Experimental Data, Monitoring, Progress Report, *Spectrophotometry, Sweden, Tables(data), *Foreign technology, EDB/540120, *Air pollution monitoring.

DE92563060/REB PC **A03**/MF **A01**
Air monitoring in the Arctic: 1980-90.
National Environmental Protection Agency, Solna (Sweden).
J. Heintzenberg, K. Holmen, S. Odh, and J. Ogren.
1991, 49p SNV-3945

Since 1979 aerosol and CO(sub 2) measurements have been made in the Svalbard region. While exploring different sites for a permanent baseline station through CO(sub 2) sampling during limited periods of time intensive experiments were conducted to elucidate the physical and chemical characteristics of the Arctic haze phenomenon. This report summarizes all gas- and particle measurements taken until the end of 1990. Parameterizations for characteristics of the Arctic aerosols are given. Long term trends and seasonal variations of CO(sub 2) concentrations in the European Arctic are compared to results from other high latitude stations in the northern hemisphere. Several examples of continuous gas and particle measurements on Spitsbergen are discussed to demonstrate their value for the study of atmospheric and oceanic processes in the Svalbard region. 35 refs., 14 figs., 3 tabs.

Keywords: Air, *Arctic Regions, Aerosols, *Air Pollution Monitoring, *Carbon Dioxide, Chemical Composition, Experimental Data, Monitoring, Particles, Seasonal Variations, Tables(data), *Foreign technology, EDB/540120.

DE92563061/REB PC **A05**/MF **A01**
Metal concentrations of the mor layer.
National Environmental Protection Agency, Solna (Sweden).
A. Andersson, A. Nilsson, and L. Haakansson. Dec 91, 85p SNV-3990
With 3p Swedish abstract.

About 360 samples from the mor layer of podsolized Swedish forest soils were analysed for HNO(sub 3) soluble Hg, Pb, Cd, Cr, Cu, Zn, Mn, Fe, Al, Ca, Mg, K and Na. The following median contents were found for the investigated heavy metals: Zn 55.2; Cu 6.29; Pb 41.3; Cr 2.52; Cd 0.64; Hg 0.233 and Mn 285 (mu)g/g (dw). The corresponding median quantities in the mor layer were: Zn 318; Cu 35.7; Pb 246; Cr 14.1; Cd 3.77; Hg 1.38 and Mn 1565 kg/km(sup 2). Based on the quartiles the contents and quantities per unit area of the analysed elements were depicted in maps of the sampled area. Concentrations of the investigated elements revealed local and regional deposition patterns better than the quantities including also the variation of the mor layer itself. Concentrations combined with quantities reveal the sensitivity of the soil to further exposition to the air pollutants. 92 refs., 32 figs., 4 tabs.

Keywords: *Humus, Acidification, Air Pollution, Aluminium, Cadmium, Calcium, Chromium, Copper, Experimental Data, Forests, Iron, Lead, Magnesium, Manganese, Mercury, Metals, Potassium, *Quantitative Chemical Analysis, Sodium, *Soil Chemistry, Soils, Sweden, Zinc, Tables(data), *Foreign technology, EDB/540210, EDB/540220, *Land pollution.

DE93711212/REB PC **A03**/MF **A01**
Phasing out of CFCs in the electronics and engineering industries in Sweden.
National Environmental Protection Agency, Solna (Sweden).
H. Ahmadzai. Dec 90, 35p SNV-3906

Through the ordinance on CFCs and halons, the Swedish Government has decided to phase out CFC use in Sweden. As regards of CFCs as cleaning and degreasing agents, the ban enters into force on Jan 1, 1991. The present report indicates the various alternatives to CFCs for cleaning and degreasing purpose, e.g. technologies that eliminate the need for cleaning, aqueous (water-based) cleaning, cleaning with other organic solvents than CFC-113 and HCFCs as well as cleaning with other chemicals. The report presents guidelines for best available technology for cleaning with solvents and recommendations from the TRE project concerning the alternatives to CFCs in the electronics industry. The purpose of the report is to provide guidance to companies, county administrations and municipalities. (au).

Keywords: *Industry, *Air Pollution Abatement, *Chlorofluorocarbons, Cleaning, Electronic Equipment, Greenhouse Gases, Recommendations, Soldering, *Foreign technology, EDB/290300, EDB/540120, *Environmental chemical substitutes.

DE93711213/REB PC **A04**/MF **A01**
Sanering av Jaernsjoen i Emaan. Huvudstudie. (Remediation of lake Jaernsjoen in the Emaan river. Main report).
National Environmental Protection Agency, Solna (Sweden).
Jan 92, 54p SNV-3999
In Swedish.

Jaernsjoen, a lake lying along River Emaan in SE Sweden, contains a large quantity of PCB which is slowly leaching out from the bottom sediments. A sampling and analysis program for Emaan has shown that Jaernsjoe sediments are the primary source for ongoing discharge of PCB to the river. Based on the current yearly discharge of 5.6 kg PCB, the 400 kg in the sediments will cause problems until at least the year 2062. However, successive reduction in the amount of available PCB means that the discharge rate will probably decrease and the problem will remain for a much longer period of time. Emaan is classified as a resource of national importance due to its valuable fish population. This includes the threatened species wels as well as a population of unusually large trout. The river has an important potential role for sport fishing. The presence of PCB in the water system threatens the values which are the basis for the rivers classification. Damage to internal organs, development and reproduction of stationary fish species can be expected. The discharge also finds its way to the Baltic Sea. Remediation of Jaernsjoen is therefore necessary if continued damage is to be avoided and to reach the goals which have been enunciated in the Swedish Environmental Protection Agencys action program for fresh water. The feasibility of remediating Jaernsjoen and the conditions under which such action can be carried out have been examined in a number of studies and investigations. This principal report contains a compilation of the results. A primary alternative has been selected for detailed remedial design. This alternative includes vacuum dredging within a protective barrier network of silt screens and flow control elements. Dredged material will be disposed of by placement in a special landfill. This remedial action is estimated to cost between 30 and 50 million Swedish kronor. The costs will be shared between responsible parties and the federal government. (au).

Keywords: *Lakes, Chlorinated Aromatic Hydrocarbons, Cleaning, Dredging, Leaching, Numerical Data, *Remedial Action, Sediments, *Water Pollution, Water Pollution Control, Tables(data), *Foreign technology, EDB/540320, *Lake Jaernsjoen, Polychlorinated biphenyls.

DE93711214/REB PC **A03**/MF **A01**
Risk assessment, Health-Environment. A research programme during the period 1992/93-1994/95.
National Environmental Protection Agency, Solna (Sweden).
1992, 27p SNV-4018

The overall objective of the 'Risk assessment, health, environment' programme is to develop models and methods for the assessment of health risks caused by environmental factors, primarily air pollutants. The programme gives priority to research into: * allergies and other hypersensitivities, * genotoxicity and carcinogenicity, * neurotoxicity, * immunotoxicology. The programme will be carried out during a three-year period. (au).

Keywords: *Air Pollution, Allergy, Carcinogenesis, *Environmental Exposure, Epidemiology, Immune System Diseases, Research Programs, *Risk Assessment, Toxicity, *Foreign technology, EDB/550600, EDB/290300.

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Wellhead Protection Strategies for Confined-Aquifer Settings.
PB93-115913/REB PC A05/MF A01

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Why do Wellhead Protection. Issues and Answers in Protecting Public Drinking Water Supply Systems.
PB93-115921/REB PC A03/MF A01

KEYWORD INDEX

Index entries in this section are selected to indicate important ideas and concepts presented in a report. When using the keyword index, be sure to look under terms narrower, broader, or related to a particular topic. Although some of the keywords are not selected from a controlled vocabulary of terms, most of them have been selected from the DoD, DoE, NASA, of NTIS controlled vocabularies. The entries are arranged by keyword and then by the NTIS order number.

SAMPLE ENTRY

Use: Keywords Term	**GLOBAL ASPECTS**
Title	Sensitivity of Ecological Landscapes and Regions to Global Climatic Change
NTIS Order Number/Media Code Price Codes	PB90-120072/HSU PC A09/MF A01

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A-68930
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PB93-107209/REB

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PB93-107100/REB

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Adenocarcinoma of the Retinal Pigment Epithelium in the Guppy 'Poecilia reticulata' Peters.
PB93-121192/REB

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PB93-123248/REB

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PB93-106904/REB
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PB93-107019/REB
Significance and Characteristics of the Personal Activity Cloud on Exposure Assessment Measurements for Indoor Contaminants.
PB93-107068/REB
Atmospheric Acidity Measurements during the Lake Michigan Urban Air Toxics Study.
PB93-121069/REB
Multicomponent Aerosol Dynamic of the Pb-O2 System in a Bench Scale Flame Incinerator.
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Toxic Substances Control Act (TSCA) Chemical Substances Inventory: Revised Inventory Synonym and Preferred Name File, June 1992.
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PB93-500239/REB
Industrial Source Complex LongTerm (ISCLT) (for Microcomputers).
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PB93-500247/REB
MESOPUFF (for Microcomputers).
PB93-500247/REB CP D02

PB93-500254/REB
CALINE: California Line Source Model (for Microcomputers).
PB93-500254/REB CP D02

PB93-500346/REB
PA-Score (Preliminary Assessment Score), Version 2.1, 5 1/4 inch (for Microcomputers).
PB93-500346/REB CP D02

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PA-Score (Preliminary Assessment Score), Version 2.1, 3 1/2 inch (for Microcomputers).
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PB93-500478/REB
Preamble and Final Sludge Rule (for Microcomputers).
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PB93-500577/REB
Oil and Hazardous Materials, Technical Assistance Data System (OHM-TADS) (for Microcomputers).
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Recommended Performance Standard of the Florida Radon Research Program.
PB93-122281/REB PC A03/MF A01

SRI-ENV-91-44-6411-070
Radon Mitigation Studies: South Central Florida Demonstration.
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13. /REB									
14. /REB									
15. /REB									
16. /REB									
17. /REB									
18. /REB									
19. /REB									
20. /REB									
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