United States
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July-September 1994

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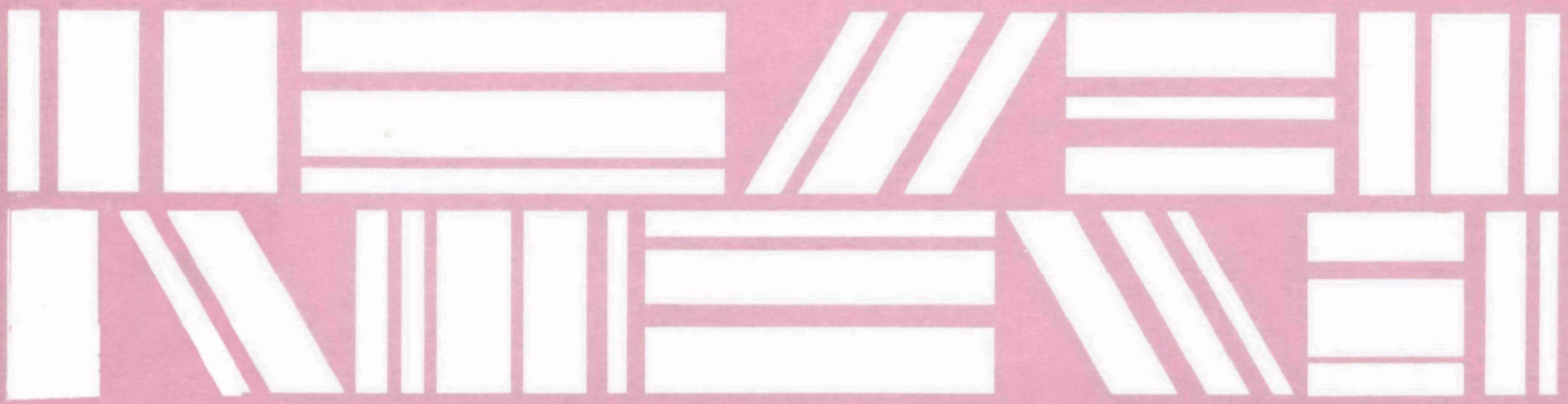
Quarterly Abstract Bulletin



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SAMPLE ENTRY

NTIS Order Number/Media Code Price Codes	**PB94-100443/REB** **PC A10/MF A03**
Report Title	Engineering and Environmental Aspects of Recycled Materials for Highway Construction
Corporate Author	University of Wyoming Research Corp., Laramie
Personal Authors	D. Bloomquist, G. Diamond, M. Oden, B. Ruth, and M. Tia.
Date	Jul 93
Pages	222p
Report Number	EPA/530/R-93/013A
Contract Number	DTFH61-93-C-00060
Abstract	The report represents an assessment of environmental aspects and engineering factors related to the utilization of recycled materials in highway construction. A basic overview and assessment of different technologies, processes, and methods of recycling various material into highway appurtenances and for highway construction are presented with consideration of environmental and health risks.
Keywords (Descriptors & Identifiers)	*Recycled materials, *Road materials, *Environmental impact assessments, Waste recycling, Materials recovery, Highway construction, Environmental issues, Emission factors, Risk assessment, Asphalts, Plastics, Glass, Rubber, Public health, Engineering assessment.

EPA PUBLICATIONS BIBLIOGRAPHY
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PB93-963354/REB Standing Order
Superfund Technical Assistance Grant (TAG) Handbook: Procurement - Using TAG Funds.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 94, 46p EPA/540/K-93/005, OSWER-9230.1-09C

Contents:
Basic Requirements;
(Identifying Potential Contractors;
Procurement Procedures;
Determining Acceptable Costs;
Developing the Contract;
and Recordkeeping);
DOs and DON'T;
Commonly Asked Questions;
Checklists;
and Step-By-Step Instructions and Sample Forms.

Keywords: *Superfund, *Procurement, *Contract management, Financial assistance, Financial management, Contractors, Cost benefit analysis, Record keeping, Requirements, Administrative procedures, Hazardous materials, Remediation, *Technical Assistance Grants.

PB93-963355/REB Standing Order
Superfund Technical Assistance Grant (TAG) Handbook: Managing Your Grant.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 94, 46p EPA/540/K-93/006, OSWER-9230.1-09D

Contents:
Basic Requirements (What to Do When You Receive Your Grant;
Keeping Track of Your Administrative Costs;
Keeping Track of Your TAG Funds;
Obtaining Payment From EPA;
Preparing Required Reports;
and Changing, Renewing, or Ending Your Grant);
Dos and Don'ts;
Commonly Asked Questions;
Grant Management Checklist;
and Sample Grant Management Documents.

Keywords: *Superfund, *Financial assistance, Financial management, Accounting, Auditing, Budgeting, Reporting requirements, Administrative procedures, Hazardous materials, Remediation, *Technical Assistance Grants.

PB93-963418/REB Standing Order
Emergency Responders Agreements for Fund-Lead Remedial Actions. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Mar 94, 4p* EPA/540/F-93/041, OSWER-9285.6-04FS
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 program's contractors frequently rely on responders from the local community to provide emergency support during remedial action. The fact sheet outlines recommended procedures to establish site specific agreements with local emergency responders for fund-lead remedial sites.

Keywords: *Hazardous materials, *Superfund, *Emergency services, *Lead(Metal), *Remedial action, Contractors, Local government, Communities, Sites, Cost effectiveness, Guidelines, Removal, Agreements, Response, HAZWOPER(Hazardous Waste Operations and Emergency Response).

PB93-963421/REB Standing Order
Superfund Removal Procedures. Removal Response Reporting: POLREPs and OSC Reports.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jun 94, 86p EPA-540/R-94/023, OSWER-9360.3-03
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

This document summarizes the relevant guidance and statutory authorities for providing response management during removal actions. Appendix A provides a comprehensive list of supporting guidance documents that may be consulted for additional information on relevant topics. Bracketed numbers appear throughout the text to indicate specific references in Appendix A. Consult the referenced documents for a more detailed explanation of removal management policies and procedures. In addition, appropriate sections of statutes and regulations are also cited throughout the text, with a full citation of each statute and regulation also appearing in the Appendix A. Appendix B contains the Key Word Index.

Keywords: *Superfund, *Waste disposal, *Law enforcement, Hazardous materials, Waste management, Emergencies, Remediation, Reporting, Site characterization, Site surveys, Accounting, Pollution regulations, Remedial response, POLREPS(POLlution REPorts), OSC(On-Site Coordinators), Emergency response, Removal response, Cleanup operations.

PB93-963510/REB Standing Order
Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Feb 94, 259p* EPA/540/R-93/081, OSWER-9285.7-15-1
See also, PB94-501517.
Paper copy available on Standing Order, deposit account required ($200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The Guidance Manual has been developed to assist the user in providing appropriate input to the Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead. The IEUBK Model is designed to model exposure from lead in air, water, soil, dust, diet, and paint and other sources with pharmacokinetic modeling to predict blood lead levels in children 6 months to 7 years old. The manual emphasizes the use of the IEUBK Model for estimating risks from childhood lead exposure to soil and household dust that might be encountered at CERCLA/RCRA sites, although other applications of the model are possible. The manual provides background information on environmental exposure parameters and recommends some useful approaches that allow flexibility for site-specific risk assessments, where possible.

Keywords: *Lead(Metal), *Children, *Environmental exposure, Health hazards, Land pollution, Soil contamination, Food chains, Air pollution effects(Humans), Water pollution effects(Humans), Soils, Dust, Biokinetic models, Risk assessment, IEUBK(Integrated Exposure Uptake Biokinetic), IEUBK model, Pharmacokinetics.

PB94-113958/REB PC **A04**/MF **A01**
Evaluation of a Solar Radiation/Delta-T Method for Estimating Pasquill-Gifford (P-G) Stability Categories.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards. C. T. Coulter. Oct 93, 53p EPA/454/R-93/055

The publication documents the effort made to develop and evaluate a new methodology for estimating stability category using on-site meteorological data that can be automatically collected and logged, e.g., wind speed and solar radiation during daytime and temperature difference (delta T) at night. The new method (Solar Radiation/Delta-T, SRDT) uses 5 wind speed classes and 4 insolation classes during daytime, and 3 wind speed classes and 2 delta T classes during nighttime. To fulfill the objectives of the evaluation three on-site meteorological data bases were obtained: Kincaid, IL (4/80 - 8/80), Longview, WA (1/91 - 12/91), and Bloomington, IN (7/91 - 7/92). The data were pooled to yield 19,540 valid hours. Using the composite data, stability classification criteria were determined iteratively for the SRDT method. Stability categories via both methods were rigorously compared for all valid hours. Overall, stability categories coincided for 62% of the hours examined, and were + or - 1 class for 89% of the hours. The same criteria were then applied to each of the three sites individually to assess site to site variability. This variability was seen to be of the order of that seen within an individual site. Finally, a dispersion model (ISC2) was run to demonstrate the effect of the SRDT method on design concentration ratios using meteorological data from all sites and for both delta T measurement heights.

Keywords: *Air pollution, *Stability, *Dispersing, Atmospheric models, Meteorological data, Atmospheric temperature, Wind velocity, Solar radiation, *Atmospheric dispersion modeling, *Pasquill-Gifford stability categories, Meteorological preprocessors.

PB94-127016/REB PC **E99**/MF **E99**
Application for Certification 1993 Model Year Light-Duty Vehicles.
Environmental Protection Agency, Washington, DC.
1993, 32039p
Set includes PB94-127024 through PB94-127438 and PB94-127545. See also PB92-182781.

No abstract available.

PB94-127024/REB PC **A25**/MF **A06**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Trucks - Isuzu.
Isuzu Technical Center of America, Inc., Plymouth, MI.
1993, 596p EPA/460/A-93/54
See also PB92-122365 and PB92-122357. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative

emission control devices, Motor vehicles(1993 models), Isuzu Technical Center of America Incorporated.

PB94-127032/REB PC **A10**/MF **A03**
Environmental Protection Agency, Washington, DC.
Application for Certificaton 1993 Model Year Light-Duty Vehicles - Isuzu.
Isuzu Technical Center of America, Inc., Plymouth, MI.
1993, 212p EPA/460/A-93/55
See also PB90-214107. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Isuzu Technical Center of America Incorporated.

PB94-127040/REB PC **A07**/MF **A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Jaguar Cars.
Jaguar Cars, Inc., Mahwah, NJ.
1993, 140p EPA/460/A-93/51
Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Jaguar Cars Incorporated.

PB94-127057/REB PC **A09**/MF **A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Jaguar.
Jaguar Cars, Inc., Mahwah, NJ.
1992, 181p EPA/460/A-93/52
See also PB92-128040. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1992 models), Jaguar Cars Incorporated.

PB94-127065/REB PC **A07**/MF **A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Jaguar.
Jaguar Cars, Inc., Mahwah, NJ.
1993, 150p EPA/460/A-93/53
Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Jaguar Cars Incorporated.

PB94-127073/REB PC **A99**/MF **E18**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Nissan.
Nissan Motor Co. Ltd., Atsugi (Japan).
1993, 1677p EPA/460/A-93/30
Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Nissan Motor Company Limited.

PB94-127081/REB PC **A12**/MF **A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Liphardt and Associates.
Liphardt and Associates, Inc., Ronkonkoma, NY.
1993, 263p EPA/460/A-93/50
Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Liphardt and Associates Incorporated.

PB94-127099/REB PC **A05**/MF **A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Trucks - PAS, Inc.
PAS, Inc., Troy, MI.
1993, 84p EPA/460/A-93/31
See also PB92-122415. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), PAS Incorporated.

PB94-127107/REB PC **A99**/MF **A06**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Porsche.
Porsche Cars North America, Inc., Reno, NV.
1993, 746p EPA/460/A-93/33
See also PB92-182880. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed techni-

cal description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Porsche Cars North America Incorporated.

PB94-127115/REB PC **A19**/MF **A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1994 Model Year Light-Duty Vehicles - Porsche.
Porsche Cars North America, Inc., Reno, NV.
1994, 433p EPA/460/A-93/32
See also PB92-182880. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1994 models), Porsche Cars North America Incorporated.

PB94-127123/REB PC **A06**/MF **A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - KIA Motors.
KIA Motors, Seoul (Republic of Korea).
1993, 106p EPA/460/A-93/49
Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), KIA Motors.

PB94-127131/REB PC **A99**/MF **A06**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Trucks - Nissan.
Nissan Motor Co. Ltd., Atsugi (Japan).
1993, 728p EPA/460/A-93/48
See also PB92-182872. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Nissan Motor Company Limited.

PB94-127149/REB PC **A99**/MF **E08**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Lotus.
Lotus Cars Ltd., Norwich (England).
1993, 826p EPA/460/A-93/47
See also PB92-182831. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Lotus Cars Limited.

PB94-127156/REB PC **A99**/MF **E08**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Trucks - Ford.
Ford Motor Co., Dearborn, MI.
1993, 845p EPA/460/A-93/34
See also PB92-122290. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Ford Motor Company.

PB94-127164/REB PC **A99**/MF **E99**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Ford.
Ford Motor Co., Dearborn, MI.
1993, 2134p EPA/460/A-93/35
See also PB92-122308. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Ford Motor Company.

PB94-127172/REB PC **A06**/MF **A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Honda.
American Honda Motor Co., Inc., Torrance, CA.
1992, 104p EPA/460/A-93/36
See also PB89-117881. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1992

models), American Honda Motor Company Incorporated.

PB94-127180/REB PC **A99/MF E08**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Honda.
American Honda Motor Co., Inc., Torrance, CA.
1993, 854p EPA/460/A-93/37
See also PB92-122332. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), American Honda Motor Company Incorporated.

PB94-127198/REB PC **A07/MF A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Harley Davidson.
Harley Davidson, Inc., Milwaukii, WI.
1993, 144p EPA/460/A-93/38
See also PB80-142573. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Harley Davidson Incorporated.

PB94-127206/REB PC **A03/MF A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Trucks - Chrysler.
Chrysler Corp., Auburn Hills, MI.
1993, 47p EPA/460/A-93/44
See also PB92-122225. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Chrysler Corporation.

PB94-127214/REB PC **A04/MF A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Chrysler.
Chrysler Corp., Detroit, MI.
1992, 56p EPA/460/A-93/45
See also PB92-122241. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1992 models), Chrysler Corporation.

PB94-127222/REB PC **A06/MF A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Chrysler.
Chrysler Corp., Auburn Hills, MI.
1993, 107p EPA/460/A-93/46
See also PB92-122241. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Chrysler Corporation.

PB94-127230/REB PC **A03/MF A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Cushman Inc.
Cushman Inc., Lincoln, NE.
1993, 15p EPA/460/A-93/43
Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Cushman Incorporated.

PB94-127248/REB PC **A14/MF A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1994 Model Year Light-Duty Vehicles - Ferrari.
Fiat Auto Research and Development, Farmington, MI. U.S.A. Branch.
1994, 302p EPA/460/A-93/42
See also PB92-122282. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1994 models), Fiat Auto Research and Development USA, Ferrari.

PB94-127255/REB PC **A99/MF E99**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - General Motors Corporation.
General Motors Proving Ground, Milford, MI.
1993, 3404p EPA/460/A-93/39
See also PB92-122316. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines

submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), General Motors Corporation.

PB94-127263/REB PC **A99**/MF **A06**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Fiat.
Fiat Auto Research and Development, Farmington, MI. U.S.A. Branch.
1993, 641p EPA/460/A-93/41
See also PB92-122282. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Fiat Auto Research and Development USA.

PB94-127271/REB PC **A99**/MF **E99**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Toyota.
Toyota Technical Center, U.S.A., Inc., Ann Arbor, MI.
1993, 3547p EPA/460/A-93/40
See also PB92-182906 and PB92-122456. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Toyota Technical Center USA Incorporated.

PB94-127289/REB PC **A99**/MF **E14**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Mazda.
Mazda Motor Corp., Hiroshima (Japan).
1993, 1233p EPA/460/A-93/15
See also PB92-122381. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Mazda Motor Corporation.

PB94-127297/REB PC **A18**/MF **A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Trucks - Mazda.
Mazda Motor Corp., Hiroshima (Japan).
1993, 404p EPA/460/A-93/14
See also PB92-122373. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Mazda Motor Corporation.

PB94-127305/REB PC **A99**/MF **E14**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Mercedes Benz.
Mercedes-Benz of North America, Inc., Montvale, NJ.
1993, 1251p EPA/460/A-93/22
See also PB92-122399. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Mercedes-Benz of North America Incorporated.

PB94-127313/REB PC **A23**/MF **A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Subaru.
Subaru, Tokyo (Japan).
1993, 540p EPA/460/A-93/23
See also PB92-122431. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Subaru.

PB94-127321/REB PC **A07**/MF **A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Nummi.
Toyota Technical Center, U.S.A., Inc., Ann Arbor, MI.
1993, 146p EPA/460/A-93/24
Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution

control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Toyota Technical Center USA Incorporated.

PB94-127339/REB PC A07/MF A02
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - American Limousine.
Global Vehicle Services Corp., Orange, CA.
1992, 138p EPA/460/A-93/25
Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1992 models), Global Vehicle Services Corporation, American Limousine.

PB94-127347/REB PC A99/MF E99
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - BMW.
BMW of North America, Inc., Montvale, NJ.
1993, 2055p EPA/460/A-93/26
See also PB92-182807. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), BMW of North America Incorporated.

PB94-127354/REB PC A05/MF A01
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Vector Aeromotive.
Global Vehicle Services Corp., Orange, CA.
1993, 78p EPA/460/A-93/27
Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Global Vehicle Services Corporation, Vector Aeromotive.

PB94-127362/REB PC A06/MF A02
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Mitsubishi.
Mitsubishi Motors, Adelaide (Australia).
1993, 116p EPA/460/A-93/28
See also PB92-122407. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Mitsubishi Motors.

PB94-127370/REB PC A99/MF E99
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Volkswagen.
Volkswagen of America, Inc., Auburn Hills, MI.
1993, 3023p EPA/460/A-93/29
See also PB92-122464. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Volkswagen of America Incorporated.

PB94-127388/REB PC A07/MF A02
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Rover Group.
Rover Group/Land Rover, Lanham, MD. Engineering Office. North America.
1993, 143p EPA/460/A-93/16
See also PB89-117956. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Rover Group/Land Rover.

PB94-127396/REB PC A99/MF A06
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Rolls Royce.
Rolls Royce Motors, Inc., Lyndhurst, NJ.
1993, 612p EPA/460/A-93/17
See also PB92-122423. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Rolls Royce Motors Incorporated.

PB94-127404/REB PC A99/MF E99
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Volvo.
Volvo of America Corp., Rockleigh, NJ.
1993, 2217p EPA/460/A-93/18
See also PB92-122472. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Volvo of America Corporation.

PB94-127412/REB PC **A25**/MF **A06**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Audi.
Volkswagen of America, Inc., Auburn Hills, MI.
1993, 594p EPA/460/A-93/19
See also PB90-213976. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Volkswagen of America Incorporated.

PB94-127420/REB PC **A09**/MF **A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Mitsubishi.
Mitsubishi Motors Corp., Tokyo (Japan).
1993, 200p EPA/460/A-93/20
See also PB92-122407. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Mitsubishi Motors Corporation.

PB94-127438/REB PC **A23**/MF **A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Trucks - Mitsubishi.
Mitsubishi Motors Corp., Tokyo (Japan).
1993, 526p EPA/460/A-93/21
See also PB92-122407. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Mitsubishi Motors Corporation.

PB94-127446/REB PC **E99**/MF **E99**
Application for Certification 1993 Model Year Heavy-Duty Vehicles.
Environmental Protection Agency, Washington, DC.
1993, 2336p
Set includes PB94-127453 through PB94-127537 and PB94-127552 through PB94-127578.

No abstract available.

PB94-127453/REB PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Heavy-Duty Diesel Engines - Mercedes-Benz.
Mercedes-Benz Truck Co., Inc., Charlotte, NC.
1992, 50p EPA/460/A-93/13
See also PB92-122530. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine design, Ignition systems, Diesel engines, Motor vehicles(1992 models), Mercedes-Benz Truck Company Incorporated.

PB94-127461/REB PC **A04**/MF **A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Heavy-Duty Diesel - Mitsubishi Motors Corporation.
Mitsubishi Motors Corp., Tokyo (Japan).
1993, 72p EPA/460/A-93/12
See also PB92-122548. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine design, Ignition systems, Diesel engines, Motor vehicles(1993 models), Mitsubishi Motors Corporation.

PB94-127479/REB PC **A04**/MF **A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Heavy-Duty Diesel Engines - Mitsubishi Motors Corporation.
Mitsubishi Motors Corp., Tokyo (Japan).
1993, 72p EPA/460/A-93/11
See also PB92-122548. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine design, Ignition systems, Diesel engines, Motor vehicles(1993 models), Mitsubishi Motors Corporation.

PB94-127487/REB PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Heavy-Duty Vehicles - Winnebago Industries, Inc.
Winnebago Industries, Inc., Forest City, IA.
1993, 35p EPA/460/A-93/10
See also PB92-182989. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engi-

neering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine design, Ignition systems, Motor vehicles(1993 models), Winnebago Industries Incorporated.

PB94-127495/REB PC **A12/MF A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Heavy-Duty Diesel Engines - Isuzu.
Isuzu Technical Center of America, Inc., Plymouth, MI.
1993, 264p EPA/460/A-93/9
See also PB90-214271. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine design, Ignition systems, Diesel engines, Motor vehicles(1993 models), Isuzu Technical Center of America Incorporated.

PB94-127503/REB PC **A05/MF A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Heavy-Duty Vehicles - Mack Trucks.
Mack Trucks, Inc., Hagerstown, MD.
1992, 94p EPA/460/A-93/8
See also PB92-182963. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, *Heavy duty engines, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine design, Ignition systems, Motor vehicles(1992 models), Mack trucks.

PB94-127511/REB PC **A13/MF A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Heavy-Duty Diesel Engines - Mack Trucks.
Mack Trucks, Inc., Hagerstown, MD.
1993, 281p EPA/460/A-93/7
See also PB92-182963. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine design, Ignition systems, Diesel engines, Motor vehicles(1993 models), Mack Trucks Incorporated.

PB94-127529/REB PC **A22/MF A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Heavy-Duty Trucks - Ford.
Ford Motor Co., Dearborn, MI.
1993, 501p EPA/460/A-93/6
See also PB92-122514. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine design, Ignition systems, Motor vehicles(1993 models), Ford Motor Company.

PB94-127537/REB PC **A19/MF A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Heavy-Duty Diesel Engines - Cummins Engine Company.
Cummins Engine Co., Inc., Columbus, IN.
1993, 426p EPA/460/A-93/5
See also PB90-214230. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine design, Ignition systems, Diesel engines, Motor vehicles(1993 models), Cummins Engine Company Incorporated.

PB94-127545/REB PC **A18/MF A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Light-Duty Vehicles - Hyundai.
Hyundai America Technical Center, Inc., Ann Arbor, MI.
1993, 421p EPA/460/A-93/4
See also PB92-122340. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 43 reports PC E99/MF E99, PB94-127016.

Every year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement of compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Light duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Engine design, Ignition systems, Evaporative emission control devices, Motor vehicles(1993 models), Hyundai America Technical Center Incorporated.

PB94-127552/REB PC **A07/MF A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Heavy-Duty Diesel Engines - Hino Motors Inc.
Hino Motors Ltd., Tokyo (Japan).
1993, 138p EPA/460/A-93/3
See also PB92-122522. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine

design, Ignition systems, Diesel engines, Motor vehicles(1993 models), Hino Motors Limited.

PB94-127560/REB PC **A10**/MF **A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Heavy-Duty Vehicles - Perkins.
Perkins Technology Ltd., Peterborough (England).
1992, 221p EPA/460/A-93/2
See also PB92-122563. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine design, Ignition systems, Motor vehicles(1993 models), Motor vehicles(1992 models), Perkins Technology Limited.

PB94-127578/REB PC **A09**/MF **A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1993 Model Year Heavy-Duty Diesel Engines - Nissan.
Nissan Diesel America, Inc., Irving, TX.
1993, 182p EPA/460/A-93/1
See also PB92-122555. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 12 reports PC E99/MF E99, PB94-127446.

Each year, each manufacturer of passenger cars, light-duty trucks, motorcycles, or heavy-duty engines submits to EPA an application for certification. In the application, the manufacturer gives a detailed technical description of the vehicles or engines he intends to market during the upcoming model year. These engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems and exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accumulation procedures, fuels to be used, and proposed maintenance requirements to be followed during testing. Section 16 of the application contains the results of emission testing, a statement or compliance to the regulations, production engine parameters, and a Summary Sheet Input Form on which issuance of a Certificate of Conformity is based.

Keywords: *Internal combustion engines, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Engine design, Ignition systems, Diesel engines, Motor vehicles(1993 models), Nissan Diesel America Incorporated.

PB94-141751/REB PC **A03**/MF **A01**
Toxic Chemical Substance Act (TSCA) Chemical Substances Inventory Documentation.
Environmental Protection Agency, Washington, DC.
29 Mar 94, 35p
For system on magnetic tape, see PB94-501194. Supersedes PB93-155166.

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. The tapes consist of two files: Inventory Preferred Name File and Inventory Synonym Name File. The first file contains the CAS Registry Number, preferred CA Index Name, molecular formula, and other appropriate information for each non-confidential Inventory chemical substance. The entries are in ascending CAS Registry Number order. The second file is a file of synonymous chemical names for the same substances listed in the Preferred Name File.

Keywords: *Environmental surveys, *Chemical compounds, Documentation, Polymers, Free radicals, Revisions, Inventories, *Toxic Substances Control Act, *Chemical Substances Inventory, CAS Registry Number, Chemical nomenclature.

PB94-144508/REB PC **A05**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Onsite Solvent Recovery. Rept. for May 91-Sep 93.
Battelle, Columbus, OH.
A. R. Gavaskar, R. F. Olfenbuttel, L. A. Hemon-Kenny, J. A. Jones, and M. A. Salem. Sep 93, 93p EPA/600/R-94/026
Contract EPA-68-CO-0003
See also PB92-232214 and PB90-103268. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

This study evaluated the product quality, waste reduction/pollution prevention, and economic aspects of three technologies for onsite solvent recovery. The technologies were (1) atmospheric batch distillation, (2) vacuum heat-pump distillation, and (3) low-emission vapor degreasing. The atmospheric and vacuum distillation units were tested on spent methyl ethyl ketone (MEK) and spent methylene chloride (MC), respectively. Samples of spent, recycled, and virgin solvents at two industrial sites were subjected to physical and chemical tests to determine solvent quality. The quality of the recycled solvent was found to be acceptable for use in the specific applications examined during this study. Significant waste reduction was achieved by reducing the volume of spent solvent to distillation residue needing disposal. The low-emission vapor degreaser (LEVD) is a fully enclosed alternative to conventional, open-top vapor degreasing. It was found to reduce air emissions by more than 99%, compared to a conventional vapor degreaser of the same production capacity.

Keywords: *Solvent recovery, *Waste recycling, *Pollution abatement, Methylene chloride, Tetrachloroethylene, Methyl ethyl ketone, Atmospheric distillation, Vacuum distillation, Vapor degreasing, Solvent extraction, Economic impact, Cost estimates, Waste minimization, Solvent recycling.

PB94-144581/REB PC **A07**/MF **A02**
Assessment and Remediation of Contaminated Sediments (ARCS) Program. Quality Assurance Program Plan.
Environmental Monitoring Systems Lab., Las Vegas, NV. Exposure Assessment Research Div.
B. A. Schumacher. Oct 93, 134p EPA/600/R-93/242
See also PB91-161679.

The 1987 amendments to the Clean Water Act, in Section 118(c)(3), authorizes the USEPA Great Lakes National Program Office (GLNPO) to coordinate and conduct a 5-year study and demonstration project relating to the control and removal of toxic pollutants in the Great Lakes, with emphasis on removal of toxic pollutants from bottom sediments. The quality assurance program plan for the Assessment and Remediation of Contaminated Sediments (ARCS) program presents the: procedures used to establish the QA/QC critieris used to control and assess data collection in the ARCS program; sampling, preparation, and analytical methods used in the ARCS program; assessment samples and procedures to verify the quality of the data; field and on-site laboratory system audits program, and techniques used to evaluate the data and document the results to GLNPO management.

Keywords: *Great Lakes, *Bottom sediments, *Water pollution effects, Environmental monitoring, Toxic substances, Water pollution sampling, Ecological concentration, Sediment-water interfaces, Sample preparation, Data analysis, Quality assurance, ARCS(Assessment and Remediation of Contaminated Sediments), Great Lakes National Program, Clean Water Act, Sediment contamination, Sediment quality criteria.

PB94-146776/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Effect of Dissolved Oxygen on Phenols Breakthrough from GAC Adsorbers. Journal article.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
R. D. Vidic, and M. T. Suidan. c1992, 11p EPA/600/J-94/143
Pub. in Water Science Technology, v26 n5-6 p1185-1193 1992. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The study demonstrates that molecular oxygen plays an important role in the adsorption of organic compounds from water by activated carbon. It was determined that the adsorptive capacity of granular activated carbon (GAC) for o-cresol can increase by almost 200% as a result of the presence of molecular oxygen in the test environment (oxic conditions). This increase in adsorptive capacity is not due to biological activity but can be totally attributed to the polymerization of o-cresol on the carbon surface under oxic conditions. The rate of adsorbate polymerization is such that the presence of molecular oxygen does not influence adsorption kinetics during the first 12 hours of adsorbent-adsorbate contact. However, the concentration of dissolved oxygen in the feed to a GAC adsorber can significantly influence the breakthrough of adsorbate. (Copyright (c) 1992 IAWPRC.)

Keywords: *Adsorption, *Activated carbon treatment, *Water pollution control, Reprint, Oxygen, Dissolved gases, Cresols, Phenols, Polymerization, Surface chemistry, Water treatment, *GAC(Granular activated carbon), Oxic conditions.

PB94-152279/REB PC **A03**/MF **A01**
Drinking Water Publications List: An Annotated Bibliography of EPA and Non-EPA Technical, Managerial, Educational and General Information Materials.
Environmental Protection Agency, Washington, DC. Office of Water.
Oct 93, 34p EPA/810/B-93/003

The annotated bibliography lists, by subject, publications related to the safety, provision and management of drinking water. These publications have been selected from a broad cross-section of the drinking water community, including government, industry and public interest organizations. The bibliography describes publications of both a general and a technical nature, and is intended for use by the general public, educators, water system operators and state and federal officials.

Keywords: *Drinking water, *Listings, *Water quality, Lead(Metal), Water treatment, Water supply, Water distribution, Distribution systems, Potable water, Water sampling, Testing, Public health, Health effects, Public information, Information dissemination, Standards, Bibliographies.

PB94-152287/REB PC **A03**/MF **A01**
Environmental Impacts of Stormwater Discharges: A National Profile.
Environmental Protection Agency, Washington, DC. Office of Water.
Jun 92, 47p EPA/841/R-92/001
See also PB84-185545.

The booklet is intended to be a capsule summary of national level information on water quality drawn from various EPA prgram reports as well as from more site specific information and data generated by local agencies and researchers over the last decade. Part 1 of this booklet defines the general nature of and impacts from stormwater discharges. Part 2 examines the pollutant characteristics and impacts of stormwater runoff. Part 3 examines lessons learned from recently implemented stormwater control strategies.

Keywords: *Storm water runoff, *Environmental impacts, *Water pollution, Nonpoint sources, Urban hydrology, Land use, Solid wastes, Microorganisms,

Toxic substances, Nutrients, Waste water, Sediments, Sectoral analysis, Watersheds.

PB94-152295/REB PC A03/MF A01
Federal Register Volume 57 No. 187 Friday, September 25, 1992 Notices. Part 4. Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity; Notice.
Environmental Protection Agency, Washington, DC. Office of Water.
25 Sep 92, 36p
See also PB92-199058 and Part 3, PB94-152303.

The Regional Administrator of Regions I, II, III, and IX (the 'Regions' or the 'Directors') are issuing final National Pollutant Discharge Elimination System (NPDES) general permits for storm water discharges associated with industrial activity in Massachusetts, Puerto Rico, District of Columbia, Guam and American Samoa; on Indian lands in New York; and from Federal facilities in Delaware. These general permits establish Notice of Intent (NOI) requirements, prohibitions, requirements to develop and implement storm water pollution prevention plans, and requirements to conduct site inspections for facilities with discharges authorized by the permit. In addition, these general permits establish monitoring requirements for certain classes of facilities and a numeric effluent limitation for discharges of coal pile runoff subject to the general permits.

Keywords: *Permits, *Storm water runoff, *Pollution regulations, Reporting requirements, Water pollution control, Administrative procedures, Notification procedures, Government policies, Law enforcement, Industrial wastes, Waste water, Regional analysis, Massachusetts, Puerto Rico, District of Columbia, Guam, American Samoa, Delaware, New York, *National Pollutant Discharge Elimination System, Indian lands, Federal facilities.

PB94-152303/REB PC A03/MF A01
Federal Register Volume 57 No. 187 Friday, September 25, 1992 Notices. Part 3. Final NPDES General Permits for Storm Water Discharges from Construction Sites; Notice.
Environmental Protection Agency, Washington, DC. Office of Water.
25 Sep 92, 27p
See also PB94-152295 and Part 2, PB93-227635.

The Regional Administrators of Regions I, II, III, IV, and IX (the 'Regions' or the 'Directors') are issuing final National Pollutant Discharge Elimination System (NPDES) general permits for storm water discharges associated with industrial activitiy from construction sites in Florida (except from Indian lands), Massachusetts, the District of Columbia, Guam and American Samoa; on Indian lands in New York; and from Federal facilities in Delaware. These general permits establish Notice of Intent (NOI) requirements, special conditions, requirements to develop and implement storm water pollution prevention plans, and requirements to conduct site inspections for facilities with discharges authorized by the permit.

Keywords: *Permits, *Storm water runoff, *Pollution regulations, Reporting requirements, Water pollution control, Administrative procedures, Notification procedures, Government policies, Law enforcement, Construction, Waste water, Regional analysis, Massachusetts, Florida, District of Columbia, Guam, American Samoa, Delaware, New York, *National Pollutant Discharge Elimination System, Indian lands, Federal facilities.

PB94-152311/REB PC A03/MF A01
Federal Register Volume 57 No. 64 Thursday, April 2, 1992, Part 4. 40 CFR Part 122. National Pollutant Discharge Elimination System Application Deadlines, General Permit Requirements and Reporting Requirements for Storm Water Discharges Associated with Industrial Activity; Final Rule.
Environmental Protection Agency, Washington, DC. Office of Water.
2 Apr 92, 23p
See also PB94-152337.

The Water Quality Act (WQA) of 1987 added section 402(p) to the Clean Water Act (CWA). Section 402(p) of the CWA requires the Environmental Protection Agency (EPA) to establish phased and tiered requirements for storm water discharges under the National Pollutant Discharge Elimination System (NPDES) program. In response to comment received on August 16, 1991, proposal, the action describes a National Strategy for issuing NPDES permits for storm water discharges associated with industrial activity. The action also contains a final rule that revises minimum NPDES monitoring requirements for storm water discharges associated with industrial activity. In addition, the rule establishes minimum requirements for filing notices of intent to be authorized to discharge under NPDES general permits.

Keywords: *Permit applications, *Storm water runoff, *Pollution regulations, Permits, Reporting requirements, Water pollution control, Standards compliance, Notification procedures, Industrial wastes, Waste water, Administrative procedures, Government policies, Discharge(Water), *National Pollutant Discharge Elimination System, Deadlines.

PB94-152329/REB PC A01/MF A01
Federal Register Volume 58 No. 70 Wednesday, April 14, 1993 Notices. NPDES General Permit for Storm Water Discharge Associated with Industrial Activity.
Environmental Protection Agency, Washington, DC. Office of Water.
14 Apr 93, 10p

The Director, Water Management Division, of the Environmental Protection Agency (EPA), Region II (the 'Director') has prepared a draft permit modification incorporating changes in the National Pollutant Discharge Elimination System (NPDES) general permit (PRR000000) for storm water discharges associated with industrial activity (except discharges from construction activity) located in the Commonwealth of Puerto Rico. The notice requests comments on proposed changes to existing monitoring frequency and reporting requirements, certain permit format/organization changes, sampling protocol and corrections to Pollution Prevention Plan deadlines.

Keywords: *Permits, *Storm water runoff, *Puerto Rico, Permit applications, Pollution regulations, Water pollution control, Waste water, Industrial wastes, Reporting requirements, Standards compliance, Administrative procedures, Discharge(Water), *National Pollutant Discharge Elimination System.

PB94-152337/REB PC A04/MF A01
Federal Register Volume 56 No. 159 Friday, August 16, 1991. Part 2. 40 CFR Part 122. NPDES General Permits and Reporting Requirements for Storm Water Discharges Associated with Industrial Activity; Proposed Rule.
Environmental Protection Agency, Washington, DC. Office of Water.
16 Aug 91, 62p
See also PB94-152311.

EPA published a final regulation on November 16, 1990. (55 FR 47990) establishing permit application requirements for storm water discharges associated with industrial activity and for discharges from municipal separate storm sewer systems serving a population of 100,000 or more. This notice requests comments on a National NPDES permitting strategy to address the large number of storm water discharges associated with industrial activity. To assist in implementing the strategy, this notice requests comments on proposed regulatory changes to existing minimum requirements for NPDES permits with regard to annual monitoring reports and minimum requirements for filing notices of intent to be authorized to discharge under NPDES general permits.

Keywords: *Permits, *Storm water runoff, *Reporting requirements, Water pollution control, Pollution regulations, Water pollution standards, Standards compliance, Industrial wastes, Clean Water Act, Legal aspects, Strategy, Administrative procedures, Discharge(Water), Storm sewers, *National Pollutant Discharge Elimination System.

PB94-152345/REB PC A02/MF A01
Federal Register Volume 56 No. 55 Thursday, March 21, 1991 Rules and Regulations. Part 4. 40 CFR Part 122. National Pollutant Discharge Elimination System Permit Application Regulations for Storm Water Discharges; Application Deadlines; Final Rule and Proposed Rule.
Environmental Protection Agency, Washington, DC. Office of Water.
21 Mar 91, 8p

EPA is extending the deadline for submission of Part 1 of group industrial storm water applications to September 30, 1991. EPA is also establishing a fixed deadline of no later than May 18, 1992 for Part 2 group applications. EPA is making these changes because EPA has received numerous requests from the regulated community that they were, until recently, unaware of the impact of EPA's November 16, 1990 rule or have had difficulty determining whether or not the regulations apply to them.

Keywords: *Permit applications, *Storm water runoff, *Pollution regulations, Permits, Standards compliance, Water pollution control, Waste water, Industrial wastes, Clean Water Act, Requirements, Extensions, Administrative procedures, Municipalities, Local government, *National Pollutant Discharge Elimination System, Applicability, Deadlines.

PB94-152352/REB PC A03/MF A01
Federal Register Volume 57 No. 175 Wednesday, September 9, 1992 Proposed Rules. Part 4. 40 CFR Part 122. National Pollutant Discharge Elimination System, Request for Comment on Alternative Approaches for Phase 2 Storm Water Program.
Environmental Protection Agency, Washington, DC. Office of Water.
9 Sep 92, 16p
See also PB94-152360.

The notice requests information and public input on Phase II of the national storm water program mandated under section 402(p)(6) of the Clean Water Act (CWA). More specifically, EPA is requesting public comment on a number of issues including scope of coverage under Phase II, identification of high risk Phase II discharges, alternative control strategies, and appropriate deadlines. With respect to each of these issues, the Agency is requesting input on how to meet environmental objectives and requirements set forth under section 402(p)(6) while at the same time identifying cost-effective control strategies that minimize the economic impact on the regulated community as well as the administrative burden on Federal, State and local government.

Keywords: *Economic impact, *Storm water runoff, *Water pollution control, Alternatives, Cost effectiveness, Pollution regualtions, Water pollution sources, Waste water, Industrial wastes, Law enforcement, Sectoral analysis, Requirements, Permits, Administrative procedures, State government, Local government, Clean Water Act, *National Pollutant Discharge Elimination System, Water Quality Act of 1987.

PB94-152360/REB PC A02/MF A01
Federal Register Volume 57 No. 244 Friday, December 18, 1992, Rules and Regulations. Part 6. 40 CFR Part 122. National Pollutant Discharge Elimination System; Storm Water Discharges; Permit Issuance and Permit Compliance Deadlines for Phase 1 Discharges. Final Rule.
Environmental Protection Agency, Washington, DC. Office of Water.
18 Dec 92, 8p
See also PB94-152352.

EPA is issuing a final rule which specifies deadlines for the issuance of NPDES permits for storm water discharges associated with industrial activity and discharges from municipal separate storm sewer systems serving a population of 100,000 or more, and deadlines by which dischargers shall comply with the terms of their permits. The action also clarifies that application requirements and deadlines for certain discharges which EPA had previously exempted from the scope of the NPDES storm water regulations are reserved pending further rulemaking. These include discharges from construction sites disturbing less than 5 acres of land and discharges exempt under 40 CFR

122.26(b)(14)(xi) because of a lack of exposure of industrial activity of storm water.

Keywords: *Permits, *Storm water runoff, *Standards compliance, Permit applications, Pollution regulations, Water pollution control, Waste water, Industrial wastes, Construction, Requirements, Extensions, Administrative procedures, Municipalities, Local government, Clean Water Act, *National Pollutant Discharge Elimination System, Water Quality Act of 1987.

PB94-152378/REB PC **A03**/MF **A01**
National Drinking Water Advisory Council: Minutes of Meeting December 2-3, 1993.
Environmental Protection Agency, Washington, DC. Office of Water.
Feb 94, 42p EPA/810/R-94/002

The U.S. Environmental Protection Agency sponsored a meeting of the National Drinking Water Advisory Council at the St. James Hotel on December 2 and 3, 1993. The publication contains the minutes of that meeting.

Keywords: *Potable water, *Meetings, Ground water, Water pollution, Water treatment, Water systems, Government policies, Regulations, Planning, State government, Local government, *National Drinking Water Advisory Council.

PB94-152386/REB PC **A03**/MF **A03**
Forest Health Monitoring: Southeast Loblolly/ Shortleaf Pine Demonstration Interim Report.
Environmental Protection Agency, Research Triangle Park, NC. Environmental Monitoring and Assessment Program.
T. E. Lewis, and B. L. Conkling. Apr 94, 363p EPA/620/R-94/006
See also PB94-114717 and PB94-152394. Prepared in cooperation with Southeastern Center for Forest Economics Research, Research Triangle Park, NC. Forest Service Lab.

The U.S. Environmental Protection Agency's Office of Research and Development is conducting an Environmental Monitoring and Assessment Program (EMAP) with other federal agencies to establish the status of and trends in the ecological health of the Nation's natural resources. The forest component of EMAP is a multiagency effort referred to as Forest Health Monitoring (FHM). The FHM program conducted a two year demonstration study to test a suite of indicators considered important in assessing forest health. The study is referred to in this report as the Southeast Loblolly/ Shortleaf Pine Demonstration, or SE DEMO. The interim report describes the results from the first year of the SE DEMO. The use of such data is encouraged by EMAP to foster a better understanding of the anticipated performance of an indicator prior to large investments in funding for field research. These data were used to the extent possible to determine the current status of each indicator with respect to the six criteria.

Keywords: *Environmental monitoring, *Forest trees, *Growth, *Ecosystems, Program management, Government agencies, Pine trees, Field tests, Economic growth, Damage assessment, Indicator species, Plant ecology, Lichens, Measurement, Wildlife, Species diversity, Vegetaton, Quality assurance, Graphs(Charts), Regions, Joint ventures, National Park Service.

PB94-152394/REB PC **A05**/MF **A01**
Environmental Protection Agency, Washington, DC. Environmental Monitoring and Assessment Program.
Forest Health Monitoring: 1991 Georgia Indicator Evaluation and Field Study.
Southeastern Center for Forest Economics Research, Research Triangle Park, NC.
S. A. Alexander, M. Baldwin, W. A. Bechtold, D. L. Cassell, and S. Cline. Mar 94, 88p EPA/620/R-94/007
Contracts EPA-68-C8-0006, EPA-68-C0-0049
See also PB94-114717. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC., Lockheed Engineering and Sciences Co., Houston, TX., and Statistical Consulting Service, Bend, OR. Sponsored by Environmental Protection Agency, Washington, DC. Environmental Monitoring and Assessment Program.

The pilot study was designed to test methods for quantifying vegetation structure, photosynthetically active radiation (PAR), dendrochronology, and selected root fungi. Testing the methods included comparing different data collection procedures for individual indicators, estimating sampling efficiency (both of the sampling design and the sampling unit design), and evaluating spatial variability. In addition, the accuracy and precision of tree height instruments were determined as part of the pilot study.

Keywords: *Environmental monitoring, *Growth, *Forest management, *Georgia, Forest trees, Vegetation, Sampling, Field tests, Plant diseases, Measurement, Height, Quality assurance, Species diversity, Fungi, Density(Mass/Volume), Age, Photosynthesis, Tables(Data), Detectors, Maps, EMAP(Environmental Monitoring and Assessment Program), Diameter at Breast height.

PB94-152493/REB PC **A03**/MF **A01**
Needs Survey, 1992. Data Tape Documentation.
Environmental Protection Agency, Washington, DC. Office of Water.
Dec 93, 40p
For system on magnetic tape, see PB94-501343.

The 1992 Needs Survey Report to Congress provides the U.S. Environmental Protection Agency's detailed estimate of the eligible capital costs to build publicly owned municipal waste water treatment facilities and capital/program development costs for other eligible activities necessary to comply with the requirements of the Clean Water Act (CWA). This includes storm water, nonpoint source and estuary programs. The survey focuses on the expanded CWA funding eligibilities under the State Revolving Fund in the 1987 Amendments to the CWA. Models were used to supplement documented needs estimates for combined sewer overflows. Models were also used to develop preliminary urban storm water and agricultural and silvicultural nonpoint source pollution control implementation costs since very little documentation of specific projects or costs was available from the States.

Keywords: *Construction costs, *Sewage treatment, *Municipalities, *Water pollution control, Surveys, Grants, Documentation, Magnetic tapes, Requirements, Cost analysis, Overflows, Combined sewers, Assessments, Mathematical models, United States, *Publicly owned sewage treatment plants, *Data format.

PB94-152550/REB PC **A13**/MF **A03**
Environmental Protection Agency, Washington, DC. Office of Research and Development.
State Acid Rain Research and Screening System, Version 1.0. User's Manual. Final rept. Dec 91-Dec 92.
RCG/Hagler, Bailly and Co., Inc., Boulder, CO.
C. A. Bogart, S. J. Epstein, K. S. Piper, and A. S. Taylor. Jan 94, 282p EPA/600/R-94/017
Contract EPA-68-D9-0142
For system on diskette, see PB94-501558. Sponsored by Environmental Protection Agency, Washington, DC. Office of Research and Development.

The report is a user's manual that describes Version 1.0 of EPA's STate Acid Rain Research and Screening System (STARRSS), developed to assist utility regulatory commissions in reviewing utility acid rain compliance plans. It is a screening tool that is based on scenario analysis and risk management techniques. STARRSS was developed to identify compliance strategies that deserve further, more detailed analysis. The system offers users three capabilities: the ability to research or verify the costs and operating impacts for compliance options at affected generating units; the ability to evaluate and compare the costs and risks associated with specific compliance strategies; and the ability to develop, evaluate, and compare suggested compliance strategies that are generated by an optimization process.

Keywords: *Acid rain, *Air pollution control, *Public utilities, *User manuals(Computer programs), State government, Pollution regulations, Standards compliance, Requirements, Risk assessment, Cost effectiveness, Economic impact, Environmental impacts, Decision making, Planning, Documentation, STARRSS computer program.

PB94-154069/REB PC **A03**/MF **A01**
Consolidated Rule Summary for the Chemical Phases.
Environmental Protection Agency, Washington, DC. Office of Water.
1992, 43p

The document summarizes the U.S. Environmental Protection Agency's National Primary Drinking Water Regulations for chemical contaminants regulated under Phases I, II, IIB and V. The standardized monitoring framework was originally promulgated under the Phase II Rule and revised under Phase IIB and V.

Keywords: *Pollution regulations, *Drinking water, *Water pollution standards, Water pollution abatement, Water pollution monitoring, Standards compliance, Chemical compounds, Contaminants, Notices, Water treatment, Analytical chemistry, *Phase I Rule, *Phase II Rule, *Phase IIB Rule, *Phase V Rule, National Primary Drinking Water Regulations.

PB94-154127/REB PC **A09**/MF **A02**
Review of Methods for Assessing Aquifer Sensitivity and Ground Water Vulnerability to Pesticide Contamination.
Environmental Protection Agency, Washington, DC. Office of Water.
Sep 93, 190p EPA/813/R-93/002
See also PB87-213914.

The EPA document is intended to help State hydrogeologists and resource managers choose from among the many methods that have been devised for assessing the susceptibility of ground water to pesticide contamination. Each State should choose a method based on its own ground water protection philosophy, hydrogeology, pesticide usage patterns, agronomic practices, available resources, and the requirements of its State Management Plan (SMP) for pesticides. The document describes the general categories of assessment methods, gives examples of each, and discusses their characteristics and limitations, including their suitability for different purposes and different hydrogeologic zones. It also provides guidance on how to choose and evaluate a method (or methods), taking into account both technical and administrative concerns. Appendix A gives contacts for all the methods discussed in the document, should readers want more information.

Keywords: *Pesticides, *Ground water, *Aquifers, Water pollution detection, Water pollution abatement, Agricultural chemicals, Path of pollutants, Vulnerability, Sensitivity, Water analysis, Leaching, Hydrogeology, Models, Case studies, Minnesota, Idaho, Snake River Plain.

PB94-154135/REB PC **A03**/MF **A01**
Safe Drinking Water Act: Reauthorization Overview.
Environmental Protection Agency, Washington, DC. Office of Water.
Feb 94, 25p EPA/810/S-94/001
See also PB92-140607 and PB94-133774.

The overview outlines Safe Drinking Water Act reauthorization recommendations, drinking water issues and solutions and some myths and facts about drinking water.

Keywords: *Water pollution standards, *Pollution regulations, Water pollution control, Water supply, Water systems, Water treatment, Potable water, Economic impact, Cost effectiveness, Recommendations, Funds, State government, *Safe Drinking Water Act, Reauthorization legislation, National Primary Drinking Water Regulations.

PB94-154168/REB PC **A02**/MF **A01**
Federal Register Volume 57 No. 175, Wednesday, September 9, 1992 Notices. Part 2. Final NPDES General Permits for Storm Water Discharges from Construction Sites; Permit Language.
Environmental Protection Agency, Washington, DC. Office of Water.
9 Sep 92, 28p EPA/833/Z-92/001
See also PB94-154184 and PB94-154192.

This is the permit language for the final national pollutant discharge elimination system general permits for storm water discharges from construction sites.

Keywords: *Water pollution control, *Permits, *Construction, Storm water runoff, Waste water, Discharge(Water), Pollution regulations, Water pollution standards, Standards compliance, Requirements,

Exemptions, Eligibility, Notification procedures, Reporting, Planning, Administrative procedures, Legal aspects, National Pollutant Discharge Elimination System, Permit language.

PB94-154176/REB PC **A06/MF A02**
Federal Register Volume 55 No. 222, Friday, November 16, 1990 Rules and Regulations. Part 2. 40 CFR Parts 122, 123, and 124. National Pollutant Discharge Elimination System Permit Application Regulations for Storm Water Discharges; Final Rule.
Environmental Protection Agency, Washington, DC. Office of Water.
16 Nov 90, 105p EPA/833/Z-90/100
See also PB93-226728 and PB94-155694.

The final rule begins to implement section 402(p) of the Clean Water Act of the Water Quality Act of 1987 which requires the Environmental Protection Agency to establish regulations setting forth National Pollutant Discharge Elimination System permit application requirements for storm water discharges associated with industrial activity; discharges from a municipal separate storm sewer system serving a population of 250,000 or more; and discharges from municipal separate storm sewer systems serving a population of 100,000 or more, but less than 250,000.

Keywords: *Water pollution standards, *Storm water runoff, *Pollution regulations, *Industries, Permits, Discharge rates, Storm sewers, Populations, Separation, Municipalities, Requirements, US EPA, National Pollutant Discharge Elimination System, Clean Water Act of 1987.

PB94-154184/REB PC **A04/MF A01**
Federal Register Volume 57 No. 175, Wednesday, September 9, 1992 Notices. Part 3. Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity; Fact Sheet.
Environmental Protection Agency, Washington, DC. Office of Water.
9 Sep 92, 65p EPA/833/Z-92/004
See also PB94-154168 and PB94-154192.

The Regional Administrators of Regions I, IV, VIII, IX and X are issuing final National Pollutant Discharge Elimination System general permits for storm water discharges associated with industrial activity (except discharges from construction activity) in 11 states; the Territories of Johnston Atoll, Midway and Wake Islands; on Indian lands in 17 states; from federal facilities in Colorado and Washington; and from Federal facilities and Indian lands in Louisiana, New Mexico, Oklahoma, and Texas.

Keywords: *Water pollution standards, *Storm water runoff, *Industries, *Permits, Nonpoint sources, Discharge rates, Requirements, Pollution regulations, Territories, Federal government, Facilities, States(United States), National Pollutant Discharge Elimination System, Indian reservations, EPA regions.

PB94-154192/REB PC **A03/MF A01**
Federal Register Volume 57 No. 175, Wednesday, September 9, 1992 Notices. Part 3. Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity; Permit Language.
Environmental Protection Agency, Washington, DC. Office of Water.
9 Sep 92, 49p EPA/833/Z-92/003
See also PB94-154168 and PB94-154184.

This is the permit language used in the final NPDES general permits for storm water discharges associated with industrial activity.

Keywords: *Water pollution control, *Permits, *Industry, Storm water runoff, Industrial wastes, Waste water, Discharge(Water), Pollution regulations, Water pollution standards, Standards compliance, Requirements, Exemptions, Eligibility, Notification procedures, Reporting, Planning, Administrative procedures, Legal aspects, National Pollutant Discharge Elimination System, Permit language.

PB94-154200/REB PC **A04/MF A01**
Interim Sewage Sludge Permit Application Form.
Environmental Protection Agency, Washington, DC. Office of Water.
Jan 94, 74p

The report is the EPA's interim Sewage Sludge Permit Application Form and its associated instructions. The form is to be used, on an interim basis, by applicants for sewage sludge use or disposal permits under the National Pollutant Discharge Elimination System program.

Keywords: *Permit applications, *Sewage sludge, *Forms(Paper), Sludge disposal, Sludge treatment, Waste utilization, Materials recovery, Waste recycling, Water pollution control, Water pollution standards, Regulations, Requirements, Permits, Administrative procedures, NPDES(National Pollutant Discharge Elimination System), POTW(Publicly Owned Treatment Works).

PB94-155223/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Leaching Boundary in Cement-Based Waste Forms. Journal article.
Dames and Moore, Cincinnati, OH.
K. Y. Cheng, P. Bishop, and J. Isenburg. c1994, 12p EPA/600/J-94/137
Grant EPA-R-816700
Pub. in Jnl. of Hazardous Materials, v30 p285-295 1992. Prepared in cooperation with Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Cement-based fixation systems are among the most commonly employed stabilization/solidification techniques. These cement waste mixtures, however, are vulnerable to acidic leaching solutions. Leaching of cement-based waste forms in acetic acid solutions with different acidic strengths has been investigated in the work. The examination of the pH profile along the acid penetration route by various pH colorimetric indicators is reported. A clear-cut leaching boundary of approximately 100 micrometers width was observed in every leached sample. (Copyright (c) 1992 Elsevier Science Publishers B.V.)

Keywords: *Hazardous materials, *Waste disposal, *Earth fills, Cements, Stabilization, Portland cements, Solidification, Metals, pH, Calcium hydroxides, Sludge disposal, Reprint, *Foreign technology, Encapsulation.

PB94-155231/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Effects of Leaching on Pore Size Distribution of Solidified/Stabilized Wastes. Journal article.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
P. L. Bishop, R. Gong, and T. C. Keener. c1994, 17p EPA/600/J-94/138
Grant ODD-RI-3-88-013
Pub. in Jnl. of Hazardous Materials, v31 p59-74 1992. See also PB90-179656. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab. and Ohio Dept. of Development, Columbus.

Chemical solidification/stabilization processes are commonly used to immobilize metals in fly ash and flue gas desulfurization (FGD) sludges and to convert these wastes into monolithic or granular materials with better handling properties and reduced permeabilities. The study evaluated the role of pore structure of solidified materials during leaching. The solidified material's initial pore structure, changes in the pore structure which result during leaching, and the effects of pore structure on leaching are discussed. It was found that pore structures varied depending upon the wastes used and the solidification mix formulations tested. After acetic acid leaching, the pore structures of samples changed remarkably. Total pore volumes and pore sizes increased. The higher the alkalinity in a sample, the greater the change of pore structure due to leaching. Changes in pore structure were primarily due to leaching of calcium hydroxide. (Copyright (c) 1992 Elsevier Science Publishers B.V.)

Keywords: *Leaching, *Pore structure, *Solidification, *Stabilization, Reprint, Fly ash, Sludges, Waste processing, Chemical reactions, Binders, Cements, Hazardous materials, Acetic acid, Calcium hydroxides, Waste forms, Flue gas desulfurization.

PB94-155249/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Metals Distribution in Solidified/Stabilized Waste Forms After Leaching. Journal article.
Dames and Moore, Cincinnati, OH.
K. Y. Cheng, and P. Bishop. c1994, 11p EPA/600/J-94/139
Grant EPA-R-816700
Pub. in Hazardous Waste and Hazardous Materials, v9 n2 p163-171 1992. See also PB87-116745. Prepared in cooperation with Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The purpose of the study is to examine the morophology, physical structure, and metal compositions of leached cement-based waste form by using various testing procedures. In the study, a series of leach tests were conducted in the laboratory. After the sample had been leached for a given period of time, the leached surface layer was physically separated from the remaining portion of the cement-based waste form. The metal contents of the surface layer and the remaining unleached waste form were examined individually. The data generated from this research will be useful to the understanding of the fate and transport of metal contaminants leaching out of solidification/stabilization waste forms. In addition, the metal distribution information could be useful in the determination of appropriate model(s) used to predict metal leaching behavior.

Keywords: *Metals, *Leaching, *Solidification, *Stabilization, Reprint, Lead(Metal), Cadmium, Arsenic, Calcium, Waste processing, Cements, Binders, Hazardous materials, Chemical reactions, Waste forms, Acetic acid.

PB94-155280/REB PC **A02/MF A01**
Evaluation of Forest Canopy Models for Estimating Isoprene Emissions. Interim rept. Jul 92-94.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
B. Lamb, E. Allwine, S. Dilts, H. Westberg, and T. Pierce. 1994, 7p EPA/600/A-94/024
Presented at the AMS Conference on Atmospheric Chemistry, Nashville, TN., January 23-28, 1994. Prepared in cooperation with Washington State Univ., Pullman., National Oceanic and Atmospheric Administration, Oak Ridge, TN. Atmospheric Turbulence and Diffusion Div., and National Center for Atmospheric Research, Boulder, CO.

During the summer 1992, environmental and biogenic hydrocarbon emissions data were collected in a mixed hardwood forest at scales ranging from leaf to canopy to the mixed layer for the purpose of investigating issues related to the scale-up of leaf or branch level emission measurements to regional emission inventories. Results from canopy measurements are compared to several different forest canopy emission models. These range in complexity from a no-canopy effects method to the PC-BEIS canopy profile method to a numerical forest canopy radiative transfer model. The investigation includes a model-to-model intercomparison of predicted canopy environmental parameters including photosynthetically active radiation (PAR) and leaf temperature. The work is seeking to evaluate relatively simple modeling approaches for use in regional emission inventories using field data and more sophisticated numerical models.

Keywords: *Hydrocarbons, *Forests, *Air pollution, Isoprene, Emission, Measurement, Regions, Inventories, Photosynthesis, Mathematical models, Gases, Heat flux, Carbon dioxide, Estimates, *Plant canopies, Radiative transfer.

PB94-155298/REB PC **A03/MF A01**
Sensitivity of the Regional Oxidant Model to an Assortment of Emission Secenarios. Interim rept. Mar 92-Nov 93.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
T. E. Pierce, K. L. Schere, and D. T. Olerud. 1993, 12p EPA/600/A-94/025
Presented at the Air and Waste Management Association International Conference on Regional Photochemical Measurement and Modeling Studies, La Jolla, CA.,

November 8-12, 1993. Prepared in cooperation with National Oceanic and Atmospheric Administration, Silver Spring, MD. Atmospheric Sciences Modeling Div. and North Carolina Supercomputing Center, Research Triangle Park, NC.

The paper examines the sensitivity of the Regional Oxidant Model (verison 2.2) to changes in emissions. The model is applied to a domain covering most of the eastern United States for the period July 2-8, 1988. Ozone calculations are presented for ten sensitivity tests: (1) base case, (2) 50% decrease in anthropogenic nitrogen oxide (NOx) emissions, (3) 50% decrease in anthropogenic volatile organic compound (VOC) emissions, (4) mobile source VOC emissions increased by a factor of 2.5 and carbon monoxide (CO) emissions increased by a factor of 1.5, (5) run No. 4 with 50% decrease in anthropogenic NOx emissions, (6) run No. 4 with 50% decrease in anthropogenic VOC emissions, (7) zero mobile source emissions, (8) soil NO emissions increased to reflect higher levels of fertilizer application, (9) biogenic VOC emissions for corn reduced to reflect a more recent (and substantially lower) emission factor, and (10) all anthropogenic emissions set to zero.

Keywords: *Air pollution, *Emission factors, Atmospheric chemistry, Reprint, Photochemical reactions, Ozone, Nitrogen oxides, Atmospheric diffusion, Regional analysis, Spatial distribution, Mathematical models, *Regional Oxidant Model, Volatile organic compounds, Emission inventories.

PB94-155322/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
U.S. EPA'S Photovoltaic Demand-Side Management Project. Rept. for Sep 92-Jul 93.
Ascension Technology, Inc., Lincoln Center, MA.
E. C. Kern, and R. J. Spiegel. 1993, 7p EPA/600/A-94/028
Contract EPA-68-D2-0148
Presented at the International Solar Energy Society Solar World Congress, Budapest, Hungary, August 23-27, 1993. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses an investigation of how photovoltaics (PV) may be used as both a pollution-mitigating energy replacement for fossil fuels and a demand-side management (DSM) option to reduce peak electrical demands of commercial and residential buildings. Eleven electric utilities are partners in this first nationwide demonstration of PV DSM. The approach is to install and monitor standardized PV systems in diverse geographic areas with varying solar energy resource and electric power demand, production, and cost conditions. The systems are being monitored for a year to record direct and diffuse irradiance, ambient air temperature, PV power generation, and building loads. Utilities are providing the electric system operations data needed to determine the pollution mitigation and peak demand reduction that can result from the PV electrical power generation.

Keywords: *Photovoltaic power supplies, *Electric power, *Power generation, *Pollution control, Photovoltaic effect, Power demand, Residential buildings, Commercial buildings, Monitoring, Irradiance, Reduction, Atmospheric temperature, Stationary sources.

PB94-155348/REB PC **A04/MF A01**
Heavy Metals and Toxic Organic Pollutants in MSW-Composts: Research Results on Phytoavailability, Bioavailability, Fate, Etc.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
J. A. Ryan, and R. L. Chaney. 1994, 56p EPA/600/A-94/030
Pub. in Proceedings of Science and Engineering of Composting: Design, Environmental, Microbiological and Utilization Aspects, Columbus, OH., March 27-29, 1992, p451-506. Prepared in cooperation with Agricultural Research Service, Beltsville, MD. Environmental Chemistry Lab.

The paper is a review and interpretation of research which has been conducted to determine the fate, transport, and potential effects of heavy metals and toxic organic compounds in Municipal Solid Waste (MSW)-composts and sewage sludges. Evaluation of research findings identified a number of pathways by which these contaminants can be transferred from MSW-compost or compost-amended soils to humans, livestock, or wildlife. The pathways consider direct ingestion of compost or compost-amended soil by livestock and children, plant uptake by food or feed crops, and exposure to dust, vapor, and water to which metals and organics have migrated.

Keywords: *Municipal wastes, *Heavy metals, *Toxic substances, *Composts, Reprint, Organic compounds, Environmental transport, Sewage sludge, Biological availability, Plants(Botany), Bioaccumulation, Food chains, Chemical properties, Path of pollutants, Environmental fate.

PB94-155371/REB PC **A03/MF A01**
Marine and Estuarine Multi-Species Test Systems. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
J. R. Clark, and C. R. Cripe. 1994, 21p EPA/600/A-94/033
Pub. in Handbook of Ecotoxicology, v1 p227-247 1993.

Environmental fate and effects studies of chemical contaminants conducted in marine and estuarine microcosm and mesocosm test systems are reviewed. Contaminant fate, persistence, and transport are discussed and related to exposure regimes that result in effects on marine biota. The value of these systems in providing controlled environments for studying contaminant issues at the individual, population, community, and system level of assessment lies in the ability to interrelate toxic effects at one level of assessment to changes observed at another. Examples of contaminant studies in microcosm and mesocosm test systems are presented to illustrate various approaches for ecotoxicological studies. Field calibration and validation of test systems are reviewed and example projects discussed.

Keywords: *Marine biology, *Species diversity, *Toxicity, *Water pollution effects, Chemical compounds, Populations, Exposure, Toxic tolerances, Field tests, Aquatic ecosystems, Reprint, Microcosms, Mesocosm, Multispecies tests.

PB94-155389/REB PC **A03/MF A01**
Methods for Spawning, Culturing and Conducting Toxicity Tests with Early Life Stages of Estuarine and Marine Fishes. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
D. P. Middaugh, L. R. Goodman, and M. J. Hemmer. 1994, 26p EPA/600/A-94/034
Pub. in Handbook of Ecotoxicology, v1 p167-192 1993.

The chapter provides a detailed description of the life history, geographical distribution of the life history, geographical distribution, and procedures for laboratory spawning, culturing and testing of five fishes, the sheepshead minnow, Cyprinodon variegatus, the inland silverside, Menidia beryllina, Atlantic silverside, M. menidia, California grunion, Leuresthes tenuis, and topsmelt, Atherinops affinis. Procedures for conducting acute toxicity tests (static and flow-through) as well as early life-stage toxicity tests are presented. Methods required for culturing of food organisms, the alga, Isochrysis galbana, rotifers, Brachionus plicatilus, and brine shrimp, Artemia salina, are also described. Tabular and diagrammatic data summaries of pertinent information required for utilization of each species in evaluation of environmental toxicants is presented.

Keywords: *Marine fishes, *Toxicity, *Estuaries, Tests, Life cycles, Geographical distribution, Minnows, Algae, Shrimps, Toxic tolerances, Environmental effects, Evaluation, Assessments, Foreign countries, *Cyprinodon variegatus, Spawning, Sheepshead minnow.

PB94-155397/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Biogenic Hydrocarbon Emission Inventory for the U.S.A. Using a Simple Forest Canopy Model. Journal article (Final) Oct 89-Oct 92.
Washington State Univ., Pullman. Lab. for Atmospheric Research.
B. Lamb, D. Gay, H. Westburg, and T. Pierce. c6 Jan 93, 19p EPA/600/J-94/105
Grant EPA-R-818572-01-0
Pub. in Atmospheric Environment, v27A n11 p1673-1690 1993. Prepared in cooperation with National Oceanic and Atmospheric Administration, Silver Spring, MD. Atmospheric Sciences Modeling Div. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

A biogenic hydrocarbon emission inventory system, developed for acid deposition and regional oxidant modeling, is described, and results for a U.S. emission inventory are presented. For deciduous and coniferous forests, scaling relationships are used to account for canopy effects upon solar radiation, temperature, humidity, and wind speed as a function of height through the canopy. Leaf temperature is calculated iteratively from a leaf energy balance as a function of height through the canopy. The predicted light and temperature levels are used with mean empirical emission rate factors and laboratory emission algorithms to predict hydrocarbon emission rates. For application to a U.S. inventory, diurnal emission fluxes of isoprene, alpha-pinene, other monoterpenes, and other hydrocarbons are predicted for eight land cover classes by state climatic division by month. The total U.S. emissions range from 22 to 50 Tg yr/-1 depending upon the formulation of different emission rate factors. Further evaluation of the inventory using field measurements is required to determine the overall accuracy of the emission estimates.

Keywords: *Acidification, *Hydrocarbons, *Forests, Atmospheric composition, Inventories, Emission, Coniferous trees, Solar radiation, Temperature, Humidity, Wind velocity, Oxidants, Leaves(Botany), Isoprene, Terpene hydrocarbons, Mathematical models, Field tests, Reprint, *Foreign technology, *Plant canopies, Acid rain.

PB94-155462/REB PC **A03/MF A01**
Modeling the Partitioning and Bioaccumulation of TCDD and Other Hydrophobic Organic Chemicals in Lake Ontario. Journal article.
Environmental Research Lab.-Duluth, MN.
D. D. Endicott, and P. M. Cook. c1994, 15p EPA/600/J-94/107
Pub. in Chemosphere, v28 n1 p75-87 1994.

Lake trout and sediment data were used to define the biota-to-sediment ratio (BSR) for hydrophobic organic chemicals (HOCs) in Lake Ontario, including 2,3,7,8-substituted polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs). The BSRs for bioaccumulative PCDD/PCDFs were found to be approximately two orders of magnitude (i.e., 100x) lower than for other HOCs of similar hydrophobicity. To evaluate this difference, a modeling framework is applied which accounts for the significant processes affecting BSR: bioaccumulation, partitioning, and sediment-water chemical distribution.

Keywords: *Water pollution effects(Animals), *Computerized simulation, *Models, *Chlorinated aromatic hydrocarbons, Biota, Lake Ontario, Dioxin, Benzofurans, Bioaccumulation, Sediment-water interfaces, Aquatic ecosystems, Concentration(Composition), Fresh water fishes, Trout, Reprint, *BSR(Biota-to-sediment ratio), *HOCs(Hydrophobic organic chemicals), *PCDDs(Polychlorinated dibenzo-p-dioxins), *PCDFs(Polychlorinated dibenzofurans), Salvelinus namaycush, Translations.

PB94-155488/REB PC **A03/MF A01**
Contaminant Effects in Marine/Estuarine Systems: Field Studies and Scaled Simulations. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
J. R. Clark, and J. L. Noles. c1994, 17p EPA/600/J-94/109
Pub. in Aquatic Mesocosm Studies in Ecological Risk Assessment, p47-56. Also pub. as Environmental Research Lab., Gulf Breeze, FL. rept. no. CONTRIB-731.

Attempts to obtain field data for risk assessment of contaminants released into marine/estuarine systems can be complicated by a number of interrelated factors such as: complex circulation and mixing patterns, diverse stratification forces. Tests conducted in simulated ecosystems are subject to constraints that restrict the effect of physical forces, limit physical scale of the test, and introduce biases from chemical partitioning and processing along the walls of the test system. These constraints restrict broad application of test results as a model of dynamic marine systems. Through selected examples from literature and ongoing studies,

authors illustrate how contaminant effects are studied at the individual, population, and community level in the field and/or in simulated ecosystems, such as mesocosms.

Keywords: *Marine biology, *Water pollution effects, *Estuaries, Reprint, Risk assessment, Circulation, Mixing, Aquatic ecosystems, Populations, Communities, Environmental impacts, Field tests, Plankton, Biota, Pesticides, Simulation, Ocean tides, Exposure, Chemical compounds, Comparison, Toxicity, Habitats, *Masocosms.

PB94-155496/REB PC **A03/MF A01**
Environmental Research Lab., Gulf Breeze, FL.
Availability of Dissolved Organic Carbon to Bacterioplankton Examined by Oxygen Utilization. Journal article.
Manhattan Coll., Bronx, NY. Dept. of Environmental Engineering and Science.
R. B. Coffin, J. P. Connolly, and P. S. Harris. c4 Nov 93, 16p EPA/600/J-94/110
Grant EPA-R-815310-02
Pub. in Marine Ecology Progress Series, v101 p9-22 1993. Also pub. as Environmental Research Lab., Gulf Breeze, FL. rept. no. CONTRIB-783. Prepared in cooperation with Technical Resources, Inc., Gulf Breeze, FL. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

Oxygen consumption is used to study the dynamics of dissolved organic carbon (DOC) utilization by bacteria. Incubation experiments (20d) for different dates and in different estuarine locations resulted in similar total oxygen utilization; however, the time to obtain maximum BOD was markedly different. In these experiments the maximum rate of oxygen consumption frequently occurred within the first 24 h. In 24-h incubation experiments, oxygen uptake and bacteria production was commonly fastest during the first six h. Rapid oxygen consumption corresponded to a proportional bacterial production. These experiments indicated that a small, highly labile component of the DOC pool supported a large fraction of bacterial production.

Keywords: *Bacteria, *Plankton, *Oxygen consumption, Dissolved organic matter, Biochemical oxygen demand, Uptake, Incubation, Aquatic microbiology, Growth rates, Respiration, Reprint, *DOC(Dissolved organic carbon).

PB94-155512/REB PC **A02/MF A01**
Fate and Survival of Microbial Pest Control Agents in Nontarget Aquatic Organisms. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
F. J. Genthner, S. S. Foss, R. P. Campbell, and J. W. Fournie. c5 Aug 93, 8p EPA/600/J-94/112
Pub. in Diseases of Aquatic Organisms, v16 p157-162 1993. Also pub. as Environmental Research Lab., Gulf Breeze, FL. rept. no. CONTRIB-808. Prepared in cooperation with Technical Resources, Inc., Gulf Breeze, FL and University of West Florida, Pensacola. Dept. of Biology.

A fully enclosed test system was developed to assess both potential adverse effects of microbial pest control agents on nontarget aquatic invertebrates and monitor their fate and survival. Eastern oysters, Crassostrea virginica, were exposed to various microbial pest control agents including the vegetative bacterium, Pseudomonas fluorescens, bacterial spores of Bacillus sphaericus, and fungal spores of Colletotrichum gloeosporioides f. sp. aeschynomene. After an exposure of 3 days for the fungus, 14 days for the bacterial spores, and 7 days for the vegetative bacterial cells, half the oysters were placed into a fully enclosed 60 liter aquarium equipped with a recirculating water system which passed water through an ultraviolet-irradiation sterilizer at a rate of 1 liter per minute. The remaining oysters were placed into wire cages maintained in Santa Rosa Sound, Pensacola, Florida. Plate counts performed on homogenized oyster tissue, revealed that all of the microbial pest control agents were found in the oyster after exposure. None of the agents colonized the animals. Oysters depurated each microorganism at a different rate. For all microbes tested, their rates of clearance from the oysters in the enclosed UV light depuration system was similar to the rate of clearance from the oysters in Santa Rosa Sound. (Copyright (c) Inter-Research 1993.)

Keywords: *Microorganisms, *Pest control, *Invertebrates, *Santa Rosa Sound, Reprint, Aquatic ecosystems, Oysters, Bacteria, Spores, Fungi, Exposure, Ultraviolet radiation, Sterilization, Circulation, Germinations, Histology, Pathology, Infectious diseases, Control, Pest control agents, Aquarium, Crassostrea virginica, Eastern oysters, Bacillus sphaericus, Bacteria.

PB94-155538/REB PC **A03/MF A01**
Importance of Physical Scaling Factors to Benthic Marine Invertebrate Recolonization of Laboratory Microcosms. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
D. A. Flemer, J. R. Clark, R. S. Stanley, C. M. Bundrick, and G. R. Plaia. c1993, 21p EPA/600/J-94/114
Pub. in International Jnl. of Environmental Studies: Estuarine and Shelf Science, v44 p161-179 1993. Also pub. as Environmental Research Lab., Gulf Breeze, FL. rept. no. CONTRIB-804. Prepared in cooperation with University of West Florida, Pensacola. Inst. for Statistical and Mathematical Modeling.

Five laboratory studies of benthic macroinvertebrate recolonization were conducted for six-wk periods to evaluate the effects of physical scaling factors (i.e., microcosm size, seawater flow rates and sediment depth) on benthic community structure. Design variables included four open-faced acrylic containers of size 7, 12, 20 and 32 cm sq; seawater flow rate - approximately 0.7 or 1.6 liters/min; and sediment depth of 2.5 or 5.0 cm. Effects of seawater flow rates were more apparent than those related to microcosm size and sediment depth. The various indices usually did not vary significantly with physical scaling factors. These results provide a basis for setting minimum experimental unit parameters and should lead to cost savings through physical scale reduction (depth of sediment and surface area) and less time to process smaller volumes of sediment and generation of smaller waste volumes.

Keywords: *Invertebrates, *Scaling, *Aquatic ecosystems, Experimental design, Benthos, Biological communities, Estuarine environment, Toxicity, Water pollution effects(Animals), Sea water, Flow rates, Sediments, Florida, Santa Rosa Sound, Responses, Reprint, *Recolonization, *Microcosms, Ecological structure, Ecotoxicological tests, Molgula, Didemnum, Corophium acherusicum, Bugula neritina, Cumingia tellinoides, Laevicardium mortoni.

PB94-155546/REB PC **A02/MF A01**
Cooperative State Research Service, Washington, DC.
Host Specificity of 'Calyptospora funduli' (Apicomplexa: Calyptosporidae) in Atheriniform Fishes. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
J. W. Fournie, and R. M. Overstreet. c1993, 10p EPA/600/J-94/115
Grant CSRS-92-38808-6920
Pub. in Jnl. of Parasitology, v79 n5 p720-727 1993. Prepared in cooperation with Gulf Coast Research Lab., Ocean Springs, MS. Sponsored by Cooperative State Research Service, Washington, DC.

Calyptospora funduli has a broad host specificity, infecting at least 7 natural and 10 additional experimental definitive hosts, all atheriniform fishes within 5 families, but most in the genus Fundulus. Barriers, apparently innate ones, prevent any development of C. funduli in perciform fishes but allow incomplete or abnormal development of the parasite in a few unnatural atherinform hosts. In the freshwater species Fundulus olivaceus and Fundulus notti, these abnormalities consisted of asynchronous development, degeneration of the parasite in early stages of development, and the formation of numerous macrophage aggregates. Rivulus marmoratus has the ability to eliminate infections with a granulomatous inflammatory response. Additional barriers that limit natural infections of C. funduli in other hosts include feeding behavior, environmental conditions, and geographic isolation.

Keywords: *Fresh water fishes, *Parasites, Infections, Barriers, Abnormalities, Feeding(Supplying), Behavior, Environmental monitoring, Geogrpahic areas, Reprint, *Fundulus olivaceus, *Fundulus notti, *Hosts, Calyptospora funduli, Atherinoform.

PB94-155561/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Fundamental Mass Transfer Model for Indoor Air Emissions from Surface Coatings. Journal article.
Acurex Environmental Corp., Research Triangle Park, NC.
B. A. Tichenor, Z. Guo, and L. E. Sparks. c1994, 8p EPA/600/J-94/117
Contract EPA-68-DO-0141
Pub. in Indoor Air, v3 p263-268 1993. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses the work of researchers at the U.S. EPA's Air and Energy Engineering Research Laboratory (Indoor Air Branch) who are evaluating mass transfer models based on fundamental principles to determine their effectiveness in predicting emissions from indoor architectural coatings. As a first step, a simple model based on Fick's Law of Diffusion has been developed. In the model, the mass transfer rate is assumed to be controlled by the boundary layer mass transfer coefficient, the saturation vapor pressure of the material being emitted, and the mass of volatile material remaining in the source at any point in time. Both static and dynamic chamber tests were conducted to obtain model validation data. Further validation experiments were conducted in a test house. Results of these tests are presented.

Keywords: *Coatings, *Indoor air pollution, *Mathematical models, Building materials, Paints, Emission factors, Organic compounds, Mass transfer, Boundary layer, Test chambers, Reprint, Emission rates.

PB94-155611/REB PC **A03/MF A01**
Nomination Guidance. 1994 Beneficial Use of Biosolids Awards Program: For Operating Projects, Technology Development and Research.
Environmental Protection Agency, Washington, DC. Office of Water.
Jan 94, 14p EPA/832/B-94/009

The document is a nomination guidance for the 1994 Beneficial Use of Biosolids Awards Program. The purpose of the awards program is to recognize the significant contributions which have encouraged the development and implementation of cost-effective and environmentally safe biosolids beneficial use practices which recycle nutrients, improve soil conditions, or otherwise conserve valuable natural resources.

Keywords: *Research and development, *Technology utilization, *Sewage sludge, *Waste management, Selection, Guidelines, Criteria, Regional analysis, State government, Environmental protection, Safety, Natural resources conservation, *Biosolids Awards Program.

PB94-155629/REB PC **A21/MF A04**
NPDES Industrial Permit Abstracts 1993.
Environmental Protection Agency, Washington, DC. Office of Water.
Oct 93, 488p EPA/833/B-93/005
See also PB93-207827.

The updated permit abstracts version was compiled in recognition of the need for abstracts of recent permits to reflect NPDES program progress and recent policies and initiatives. These abstracts were written based on voluntary submissions of NPDES industrial wastewater permits, requested from States and EPA regional permitting authorities. The edition of the abstracts includes permits from 37 states. The permit abstracts are organized into five sections: general information, permit summary information, outfall information, special conditions information, and dates. These abstracts are indexed by the following subjects, to provide quick searches: Type of limitations/monitoring conditions, such as best professional judgement or state water quality standards; Type of species condition, such as requirements for a best management practices plan or a storm water plan; Effluent guidelines; Pollutant; Receiving water; and Type of industry, i.e., SIC code. The remaining discussion is on the contents of the five sections of the abstract.

Keywords: *Permits, *Water pollution control, *Industrial plants, Waste water, Industrial wastes, Permit applications, Pollution regulations, Water pollution standards, Compliance, Enforcement, Effluents, Storm water runoff, Water treatment, Sectoral analysis, NPDES(National Pollutant Discharge Elimination System), Best management practices.

PB94-155637/REB PC A08/MF A02
Permit Compliance System (PCS) QNCR Training Manual.
Environmental Protection Agency, Washington, DC. Office of Wastewater Enforcement and Compliance.
27 Dec 93, 153p

The Quarterly Noncompliance Report (QNCR) is a preprogrammed report that is generated quarterly listing the National Pollutant Discharge Elimination System (NRDES) permits that are in noncompliance according to the Federal Code of Regulations guidelines. The Permit Compliance System (PCS) tracks the compliance and enforcement activities conducted under the NPDES program, and automatically generates the QNCR. These training materials are designed to assist those who work with the QNCR to better understand its contents. The training has been designed for those who have participated in the PCS Basic Training course.

Keywords: *Pollution regulations, *Training manuals, Water pollution control, Inspection, Water pollution detection, Industrial plants, Industrial wastes, Violations, Standards compliance, Permits, Law enforcement, Education, *Permit Compliance System, QNCR(Quarterly Noncompliance Report), RNC(Reportable Non-Compliance), National Pollutant Discharge Elimination System.

PB94-155660/REB PC A05/MF A01
Water-Related Newsletters.
Environmental Protection Agency, Washington, DC. Office of Water.
Dec 93, 94p EPA/800/B-93/005

This directory provides subscription and content information for many water-related newsletters from conservation groups, government agencies and professional associations.

Keywords: *Directories, *Bibliographies, *Water resources, Ground water, Surface waters, Estuaries, Coasts, Resource conservation, Oceans, Government agencies, Marine environments, Water quality, Water pollution, US EPA, *Newsletters.

PB94-155694/REB PC A03/MF A01
Federal Register Volume 56 No. 214, Tuesday, November 5, 1991 Rules and Regulations. Part 2. 40 CFR Part 122. National Pollutant Discharge Elimination System Permit Application Regulations for Storm Water Discharges; Application Deadlines; Final Rule and Proposed Rule.
Environmental Protection Agency, Washington, DC. Office of Water.
5 Nov 91, 12p
See also PB94-154176.

US EPA is extending the deadline for submission of National Pollutant Discharge Elimination System individual permit applications for storm water discharges associated with industrial activity from November 18, 1991 to October 1, 1992. EPA is also establishing a fixed deadline of no later than October 1, 1992, for submission of individual permit applications from dischargers rejected from group applications.

Keywords: *Water pollution standards, *Storm water runoff, *Permits, *Industries, Discharge rates, Utilization, Applicants, Requirements, Pollution regulations, US EPA, National Pollutant Discharge Elimination System, Time period.

PB94-155827/REB PC A03/MF A01
Guidelines for Reproductive Toxicity Risk Assessment. (Review Draft).
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.
E. Clegg. Mar 94, 43p EPA/600/AP-94/001, OHEA-R-558
See also PB87-175303, PB89-201925 and PB93-167286.

In 1988, EPA published separate Proposed Guidelines for Assessing Male Reproductive Risk and Proposed Guidelines for Assessing Female Reproductive Risk. Changes made based on previous public comment and SAB review include combining the separate guidelines for assessing male and female reproductive risk into a single document, integrating the hazard identification and dose-response sections, assuming as a default that an agent for which sufficient data are available on only one sex may also affect reproductive function in the other sex, expansion of the section on interpretation of female endpoints, and consideration of the benchmark dose approach for quantitative risk assessment. This external review draft document will be revised after public review and comment.

Keywords: *Toxicity, *Risk assessment, *Reproduction(Biology), Testings, Males, Females, Exposure, Biological accumulation, Fertility, Dose-response relationships, Biological markets, Histology.

PB94-155876/REB PC A08/MF A02
Louisianian Province Demonstration Report. EMAP-Estuaries: 1991.
Environmental Research Lab., Gulf Breeze, FL.
J. K. Summers, J. M. Macauley, V. D. Engle, G. T. Brooks, and P. T. Heitmuller. Oct 93, 165p EPA/620/R-94/001
See also PB94-117488. Prepared in cooperation with Technical Resources, Inc., Gulf Breeze, FL. and Computer Sciences Corp., Gulf Breeze, FL.

The report summarizes the Louisianian Demonstration Project conducted by the Estuaries Resource Group of the Environmental Monitoring and Assessment Program (EMAP), a national program initiated by EPA to integrate efforts of governmental agencies in evaluations of status and trends of ecological resources of the U.S. The Louisianian Province represents a single biogeographic area corresponding to the Gulf of Mexico. The demonstration project was conducted during July and August 1991, using a probability-based sampling design to evaluate the condition of Gulf of Mexico estuarine resources. The assessment is preliminary and its findings should be confirmed by subsequent years of sampling in the Louisianian Province, which extends from Rio Grande, Texas, to Anclote Anchorage, Florida.

Keywords: *Louisiana, *Mexico Gulf, *Estuaries, Ecosystems, Land use, Benthos, Coastal areas, Water pollution effects, Sampling, Biological accumulation, Fishes, Statistical analysis, EMAP(Environmental Monitoring and Assessment Program).

PB94-155884/REB PC A19/MF A04
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Handbook of GC/MS Data and Information for Selected Clean Air Act Amendments Compounds.
Rept. for Jan 92-Dec 93.
Radian Corp., Research Triangle Park, NC.
J. Rice, J. T. Bursey, J. F. McGaughey, R. G. Merrill, and D. J. Harvan. Mar 94, 450p EPA/600/R-94/021
Contract EPA-68-D1-0010
Prepared in cooperation with Triangle Labs., Research Triangle Park, NC. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

This Handbook presents a compilation of the results of laboratory experiments to test the applicability of GC/MS techniques using EPA methods 8270 and 5041, and the compatibility of the Title III organic compounds with organic solvents. The Handbook contains the following information: (1) Compounds that can and cannot be analyzed; (2) Relative response factors; (3) Chromatograms, reference mass spectra; and (4) Evaluation of compound compatibility for semivolatile organic compounds in isolation. Data and information included in the Handbook are intended to address analytical issues only; sample collection issues are not addressed.

Keywords: *Air pollution sampling, *Gas chromatography, *Mass spectroscopy, Organic solvents, Chemical analysis, Mass spectra, Chromatographic analysis, Graphs(Charts), Tables(Data), Clean Air Act, Handbooks, EPA Method 8270, EPA Method 5041, Volatile organic compounds, Semivolatile organic compounds, Volatile organic sampling train.

PB94-156049/REB PC A18/MF A04
Roanoke River Water Flow Committee Report for 1991-1993. Final rept.
Albemarle-Pamlico Estuarine Study, Raleigh, NC.
R. A. Rulifson, and C. S. Manooch. Nov 93, 412p
APES-93-18
See also PB92-111947.

The purpose of this Flow Report is to document hydrological events and reservoir operations for 1991-1993 in context with field research efforts and observations in the lower Roanoke River Basin on a number of watershed resources: fisheries (especially stripped bass), wildlife, agriculture, and timber.

Keywords: *Roanoke River Basin, *Fisheries, *Waterflow, Hydrology, Reservoirs, Watersheds, Wildlife, Agriculture, Structural timber, Forestry, Ecology, Invertebrates, Habitats.

PB94-156197/REB PC A05/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air Risk Information Support Center.
Analysis of Ambient Monitoring Data in the Vicinity of Open Tire Fires.
TRC Environmental Corp., Chapel Hill, NC.
Jul 93, 99p EPA/453/R-93/029
Contract EPA-68-D0-0121
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air Risk Information Support Center.

The report documents the collection of air monitoring data, much of which is unpublished, from 22 actual tire fire emergencies. An exploratory analysis revealed that several types of summary statistics may be appropriate, if the air monitoring data were divided into those measurements taken at less than 1000 feet from the edge of the tire fire and those taken at greater than 1000 feet. The report is organized into three major components: Executive Summary, Detailed Report, and Appendices.

Keywords: *Tire fires, *Air pollution sampling, *Combustion products, Tire materials, Scrap, Chemical analysis, Spatial distribution, Health hazards, Risk assessment, Exposure, Emissions, Volatile organic compounds.

PB94-156486/REB PC A05/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air Risk Information Support Center.
Toxic Emissions from Aircraft Engines: A Search of Available Literature.
Research Triangle Inst., Research Triangle Park, NC.
Jul 93, 91p EPA/453/R-93/028
See also PB94-152303. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air Risk Information Support Center.

The purpose of the work is to find what recent data are available to characterize air toxics from aircraft engines as to specific compounds and their health effects. Specific items of interest are emissions from helicopter, civil, and military engines differentiated by mode of operation such as takeoffs, landings, taxiing, and idle.

Keywords: *Aircraft exhaust, *Air pollution, *Exhaust emissions, Literature surveys, Combustion products, Chemical composition, Hydrocarbons, Jet engine exhaust, Jet engines, Piston engines, Turbines, Helicopters, Aviation fuels, Health effects.

PB94-156544/REB PC A10/MF A03
North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.
Watershed Planning in the Albemarle-Pamlico Estuarine System. Report 5 - Fishing Practices Mapping. Final rept.
Research Triangle Inst., Research Triangle Park, NC.
P. A. Cunningham, R. J. Curry, R. W. Pratt, S. J. Stichter, and K. West. Dec 92, 220p APES-92-05
Portions of this document are not fully legible. Prepared in cooperation with North Carolina Div. of Marine Fisheries, Morehead City. Sponsored by North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study. and Environmental Protection Agency, Atlanta, GA. Region IV.

The report presents the results of a project to map current fishing practice areas in the Albemarle-Pamlico estuarine system, with the purposes of identifying major finfishing and shellfishing practices, describing gear used in these practices, identifying equipment and harvest restrictions currently in force to manage these practices, and using the Geographic Information

System for further analysis and management action by Stage agencies.

Keywords: *Fishing, *Harvesting, *Estuaries, Project planning, Shellfish, Clams, Oysters, Dredging, Collecting methods, Crabs, Rakes, Shrimps, Equipment, Regulations, Nets, Mapping, *Albemarle Pamlico Estuary, *Fishing gear, Crab trauling.

PB94-156551/REB PC A10/MF A03
Albemarle-Pamlico Estuarine Study, Raleigh, NC.
Inventory and Protection Plan for Southeast Virginia's Critical Natural Areas, Exemplary Wetlands, and Endangered Species Habitats. Final rept.
Virginia Dept. of Conservation and Recreation, Richmond, VA. Div. of Natural Heritage.
T. J. Rawinski, and G. P. Fleming. May 93, 217p APES-93-13
Portions of this document are not fully legible. Sponsored by Albemarle-Pamlico Estuarine Study, Raleigh, NC.

The report is based on documentation from 57 critical sites in the Albemarle-Pamlico Estuarine Study region of southeastern Virginia. The sites were prioritized according to their biological significance, described in detail, and mapped (iii). From this information, protection and management recommendations were prepared for each site and for the regions a whole (ibid) with the purpose of preventing further critical natural area destruction, and to assist in local planning.

Keywords: *Natural resources management, *Environmental protection, *Swamps, *Estuaries, Habitats, Endangered species, Management, Local government, Damage assessment, Plants(Botany), Herbicides, Perch, Inventories, Blackwater River, Maps, Forest trees, Mussels, *Southeast Region(Virginia), *Wetlands, Albemarle-Pamlico Estuarine Region, Kalmia latifolia, Mountain laurel.

PB94-156593/REB PC A04/MF A01
North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.
Role of a Newly Discovered Toxic Dinoflagellate in Finfish and Shellfish Kills in the Neuse and Pamlico Estuaries. Final rept.
North Carolina State Univ. at Raleigh. Dept. of Botany.
J. M. Burkholder, H. B. Glasgow, E. J. Noga, and C. W. Hobbs. Aug 93, 67p APES-93-08
See also PB83-236133. Sponsored by North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.

The objectives of the study were to obtain field and experimental information needed to formally speciate and characterize the general ecology of a newly discovered toxic estuarine dinoflagellate, and to examine its significance in causing fish kills in the Neuse and Pamlico (North Carolina) estuaries.

Keywords: *Toxicity, *Dinoflagellate, *Estuaries, *Fisheries, Shellfish, Ecology, Physical properties, Life cycles, Phosphorus, Nitrogen, Growth, Biological stress, Control, Mortality, *Fish kills, *Finfish, Neuse Estuary, Pamlico Estuary, Pfiesteria piscimorte.

PB94-156684/REB PC A08/MF A02
Guidelines for MACT Determinations under Section 112(g). (Proposal).
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
L. Hutchinson. 1 Feb 94, 159p EPA/450/3-92/007B
See also PB93-183283.

The guidance document is designed to clarify the statutory and regulatory requirements for MACT determinations as required by Section 112(g) of the Clean Air Act (the Act) as amended in 1990. It sets forth procedures for determining emission limitations based on maximum achievable control technology for major sources that construct, reconstruct or modify. The manual is divided into six chapters and a four section appendix.

Keywords: *Air pollution standards, *Air pollution control, *Pollution regulations, Emissions, Hazardous materials, Permits, Environmental impacts, Cost analysis, Law enforcement, Clean Air Act and Amendments of 1990.

PB94-156692/REB PC A07/MF A02
Guidance on the Post-1996 Rate-of-Progress Plan and the Attainment Demonstration. Ozone/Carbon Monoxide Programs Branch (Corrected Version as of February 18, 1994).
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
J. Silvasi, S. Kimbrough, L. Schultz, K. Scavo, and G. Dolce. Jan 94, 145p EPA/452/R-93/015
See also PB93-122356 and PB93-200525.

Section 182(c)(2) of the Act requires each serious and above ozone nonattainment area to submit a SIP revision by November 15, 1994, which provides for an actual VOC emission reduction of at least 3 percent per year averaged over each consecutive 3-year period beginning 6 years after enactment of the Act (i.e., November 15, 1996) until the area's attainment date. The portion of the SIP revision that illustrates the plan for the achievement of the post-1996 emission reductions is defined as the post-1996 rate-of-progress plan. The SIP for serious and above areas must also include a demonstration that the plan will provide for attainment of the ozone NAAQS by the applicable date. The demonstration must be based on photochemical grid modeling, such as UAM. The requirement also applies to all multi-State areas. NOx emission reductions can be substituted for the required VOC emission reductions in the post-1996 plan.

Keywords: *Nitrogen oxides, *Emissions, *Volatile organic compounds, *Reduction, *Air pollution control, Subsitutes, Requirements, Guidelines, Area, States(United States), Photochemical reactions, Mathematical models, Flow charts, Point sources, Inventories, Motor vehicles, Standards, *Rate-of-progress plan, Attainment demonstration, Grid modeling, Target levels.

PB94-156718/REB PC A07/MF A02
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Alternative Control Techniques Document: PM-10 Emissions from Selected Processes at Coke Ovens and Integrated Iron and Steel Mills. Final rept.
TRC Environmental Corp., Chapel Hill, NC.
P. J. Marsosudiro, and W. S. Snow. Feb 94, 130p EPA/453/R-94/005
Contract EPA-68-D0-0121
See also PB92-180017. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The purpose of the document is to provide guidance to state and local air quality management agencies for determining reasonably available control technologies (RACT) and best available control technologies (BACT) that apply to PM-10 sources in the iron and steel industry. Emission sources addressed are coke pushing, coke quenching, coke sizing and screening, casthouse operations, hot metal transfer, and desulfurization. These sources were selected for analysis because they are not presently regulated under New Source Performance Standards (NSPS). Emission control system descriptions, environmental and energy impact assessments, and control cost analyses are presented. The principal emission collection devices used are the fabric filter and wet venturi scrubber.

Keywords: *Foundries, *Air pollution control equipment, *Iron and steel industry, Coking, Emission, Pollution sources, Steel making, Desulfurization, Iron, Production, Reduction, Control equipment, Cost analysis, Scrubbers, *Alternative control techniques, Model plants, Fugitive dust, Fabric filters.

PB94-156783/REB PC A04/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Toxic Emissions from Aircraft Firefighting Training: A Search of Available Literature.
Research Triangle Inst., Research Triangle Park, NC.
Jul 93, 63p EPA/453/R-93/027
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The document attempts to compile citations and brief descriptions of studies and data regarding toxic air emissions released during training exercises for firefighting at airports. Many training exercises use real aviation fuels (JP4, JP5...) to simulate real fire conditions. The burning of such fuels also causes the release of toxic combustion by-products. Such practices have raised concerns about the public health effects of the combustion by-products. Little is known about the emission characteristics of such burning. The purpose of the work is to find what recent data are available on the toxic and volatile organic compound (VOC) emissions and on health effects from open burning of aviation fuels.

Keywords: *Toxic substances, *Air pollution, *Aviation fuels, *Fire fighting, *Training, *Bibliographies, *Health hazards, Volatile organic compounds, Air quality, Combustion products, Airports, Reviews, Public health, Hydrocarbons, Air Risk Information Support Center.

PB94-156791/REB PC A10/MF A03
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Alternative Control Techniques Document: Industrial Cleaning Solvents. Final rept.
Midwest Research Inst., Cary, NC.
Feb 94, 213p EPA/453/R-94/015
Contract EPA-68-D1-0115
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The report provides alternative control techniques (ACT) for State and local agencies to consider for incorporating in rules to limit emission of volatile organic compounds (VOC's) that otherwise result from industrial cleaning with organic solvents.

Keywords: *Organic solvents, *Air pollution control, *Alternatives, Cleaning agents, Cleaners, Substitutes, Emission factors, Cost analysis, Pollution regulations, Local government, State government, Clean Air Act, Air pollution sources, Industry, Economic analysis, Volatile organic compounds.

PB94-157211/REB PC A02/MF A01
Effects of Dietary Exposure to Forest Pesticides on the Brown Garden Snail 'Helix aspersa' Mueller. Journal article.
Corvallis Environmental Research Lab., OR.
G. S. Schuytema, A. V. Nebeker, and W. L. Griffis. c1994, 7p EPA/600/J-94/156
Pub. in Archives of Environmental Contamination and Toxicology, v26 p23-28 1994. See also PB89-126072.

Brown garden snails, Helix aspersa, were fed prepared diets with 12 pesticides used in forest spraying practices where endangered arboreal and terrestrial snails may be at risk. Acephate, atrazine, glyphosate, hexazinone, and picloram were not lethal at concentrations of 5,000 mg/kg in 14-day screening tests. The remaining seven pesticides, lethal to 13-100% of the tested snails at 5,000 mg/kg, were evaluated in 10-day definitive feeding tests. Azinphosmethyl (Guthion) and aminocarb were the most toxic, with 10-day LC50s of 188 and 313 mg/kg, respectively. Paraquat, trichlorfon and fenitrothion had 10-day LC50s of 659, 664, and 7,058 mg/kg respectively. Avoidance of pesticide-containing foods occurred, e.g., 10-day LC50s of $>10,000$ mg/kg for carbaryl and ethyl parathion. Significant decreases ($p<0.05$) in snail weight (total, shell-only, body-only) or shell diameter were accompanied by a significant decrease in the amount of food consumed/snail/day. Concentrations of pesticide in tissues were measured in snails exposed to atrazine and azinphosmethyl; there was no bioaccumulation. (Copyright (c) 1994 Springer-Verlag New York Inc.)

Keywords: *Exposure, *Pesticides, *Snails, *Forests, Atrazine, Toxicity, Diets, Paraquat herbicide, Methyl parathion, Carbaryl, Feeding(Supplying), Tests, Toxic tolerances, Food consumption, Mortality, Tissues(Biology), Concentration(Composition), Reprint, *Helix aspersa, Brown snails, Azinophosmethyl, Picloram.

PB94-157229/REB PC A02/MF A01
Interferences, Limitations and an Improvement in the Extraction and Assessment of Cellulase Activity in Soil. Journal article.
Corvallis Environmental Research Lab., OR.
L. K. Gander, C. W. Hendricks, and J. D. Doyle. c1994, 9p EPA/600/J-94/155
Pub. in Soil Biology and Biochemistry, V26 n1 p65-73 1994. Prepared in cooperation with ManTech Environ-

mental Technology, Inc., Corvallis, OR. Environmental Research Lab.

A practical modification of a reducing-sugar method to estimate soil (carboxymethyl) cellulase activity is described and used to compare three non-sterile soils. The original method involves the formation of a ferric-ferrocyanide complex in soil extracts prepared and exposed to substrate in 2 MOLAR acetate buffer. The authors used 67 milliMolar acetate buffer and were able to detect and compare cellulase activities in three diverse soils using undiluted extracts. The values obtained were more reproducible, but in a different range from those of the original method. The use of undiluted soil extracts prepared in less concentrated buffer simplifies and extends the practicality of the assay by: (1) reducing the importance of using matrix-matched standard curves; (2) requiring less sample manipulation and glassware, and (3) preventing the dilution to extinction of enzyme activity. It also improves the usefulness of the method as an indicator of ecological effects (biomass turnover) due to the introduction of nonindigenous microorganisms and chemicals of environmental concern. These factors make the method more competitive with other reducing-sugar assays used to measure cellulase activity in soil. (Copyright (c) 1994 Government of Canada).

Keywords: *Soil chemistry, *Biochemistry, *Cellulase, Enzyme activity, Qualitative analytical chemistry, Assaying, Enzymes, Biomass, Toxic substances, Soil pollution, Environmental tests, Risk assessment, Biological indicators, Biotechnology, Soil bacteria, Reprint.

PB94-157237/REB PC **A01**/MF **A01**
Toxicity and Estimated Water Quality Criteria Values in Mallard Ducklings Exposed to Pentachlorophenol. Journal article.
Corvallis Environmental Research Lab., OR.
A. V. Nebeker, W. L. Griffis, and G. S. Schuytema.
1994, 5p* EPA/600/J-94/154
Pub. in Archives of Environmental Contamination and Toxicology v26 n1 p33-36 1994.

Tests were conducted to determine the effects of pentachlorophenol (PCP) in feed on growth and bioaccumulation in mallard ducklings. Significant effects of PCP on growth (LOAEL) were observed after 11 days at 961 micrograms/g PCP. The NOAEL value (no significant growth effects) was 423 micrograms/g PCP. Concentrations of PCP in tissues at the NOAEL were 20.7 (liver), 12.2 (lipid), 3.3 (muscles), and 2.6 (brain) micrograms/g (wet wt.); no bioaccumulation was observed. Using a toxicity threshold model, it was estimated that about 1.1 mg/L of waterborne PCP was a threshold for adverse effects for mallard ducks.

Keywords: *Toxicity, *Ducks, *Feeding stuffs, *Growth, *Water pollution effects, *Marine biology, Pesticides, Biological accumulation, Concentration(Composition), Tissues(Biology), Exposure, Phenols, Mathematical models, *Phenol/pentachloro, PCP herbicide.

PB94-157245/REB PC **A01**/MF **A01**
Effects of Dieldrin in Food on Growth and Bioaccumulation in Mallard Ducklings. Journal article.
Corvallis Environmental Research Lab., OR.
A. V. Nebeker, K. D. Dunn, W. L. Griffis, and G. S. Schuytema. 1994, 5p EPA/600/J-94/153
Pub. in Archives of Environmental Contamination and Toxicology, v 26 n1 p29-32 1994. See also PB81-117301, PB82-208752 and PB89-220016.

The effects of dieldrin in food organisms and commercial feed on growth and bioaccumulation were determined in mallard duckling. Dieldrin-fed crickets, mealworms and annelid worms, and dieldrin-spiked commercial feed, were fed to mallard ducklings for 8 days. Mean measured food concentrations (animals plus feed) of <0.2, 2.6, 26.2, and 49.3 microgram/g dieldrin did not affect growth after 14 days. Tissue dieldrin concentrations (microgram/g wet wt) increased rapidly: up to 80.7(lipid), 30.1(skin), 4.1(liver), 1.8(muscle), and 1.6(brain) microgram/g. Dieldrin concentrations in tissues were up to 3.7 times greater than in the test diets.

Keywords: *Dieldrin, *Ducks, *Bioaccumulation, *Toxicity, Insecticides, Water pollution effects(Animals), Environmental exposure, Birds, Biological effects, Food consumption, Growth, Soil pollution, Halohydrocarbons, Food chains, Reprint, *Phenol/pentachloro, *Anas platyrhynchos.

PB94-157252/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Carbon Sources and Sinks in Forest Biomes of the Former Soviet Union. Journal article.
Oregon State Univ., Corvallis. Dept. of Civil Engineering.
T. P. Kolchugina, and T. S. Vinson. cJun 93, 17p EPA/600/J-94/152
Pub. in Global Biogeochemical Cycles, v7 n2 p291-304 Jun 93. See also PB93-191484. Sponsored by Corvallis Environmental Research Lab., OR.

Net primary productivity (NPP) of Soviet forest biomes has been estimated from an equilibrium analysis at seven percent of the global terrestrial NPP, 20 percent of the world's total forest NPP, and half of boreal and temperate forest NPP. However, an equilibrium analysis does not allow the assessment of the role of forest biomes in carbon sequestration because it is based on the assumption that the annual carbon increment in forest biomes equals the amount of carbon released to the atmosphere through respiration. A non-equilibrium analysis accounts for carbon sequestration during specific stages of forest ecosystem development. Sources and sinks of carbon and the sequestration potential of forest biomes in the former Soviet Union are assessed in the present study under non-equilibrium conditions by considering (1) net ecosystem productivity of different age forest stands and their actual coverage, (2) carbon flux related to forest fires, (3) the rate of peat accumulation, and (4) anthropogenic influences.

Keywords: *USSR, *Carbon cycle, *Terrestrial ecosystems, *Forests, Biomes, Plant ecology, Forest fires, Atmospheric chemistry, Biomass, Sources, Weight(Mass), Peat, Accumulation, Productivity, Reprint, *Carbon sinks, Carbon pools, Anthropogenic sources.

PB94-157260/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Anaerobic Treatment of a Simulated High-Strength Industrial Wastewater Containing Chlorophenols. Journal article.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
J. R. V. Flora, M. T. Suidan, A. M. Wuellner, and T. K. Boyer. c1994, 35p EPA/600/J-94/151
Pub. in Water Environmental Research, v66 n1 p21-31 Jan/Feb 94. Prepared in cooperation with Montgomery (James M.) Consulting Engineers, Inc., Pasadena, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

An anaerobic fluidized-bed granular activated carbon (GAC) reactor employing carbon replacement was evaluated for the treatment of a simulated high strength industrial wastewater containing inhibitory concentrations of chlorophenols. The reactor was fed 2000-5900 mg/l acetic acid, 1000-3000 mg/l phenol, 1200 mg/l ortho-chlorophenol (2-CP), 600 mg/l 2,4-dichlorophenol (2,4-DCP), and 150 mg/l 2,4,6-trichlorophenol (2,4,6-TCP). The effects of varying the carbon replacement rate, the bulk operating pH, and the organic loading on reactor performance were investigated. The system was highly effective for treating the wastewater and an overall chemical oxygen demand (COD) removal greater than 98% was achieved. Carbon replacement resulting in a GAC solids mean retention time (SMRT) of 100 days was necessary to control the build-up of an inhibitory degradation by-product, para-chlorophenol (4-CP).

Keywords: *Activated carbon treatment, *Fluidized bed processors, *Industrial waste treatment, Chlorine aromatic compounds, Anaerobic processes, Concentration(Composition), Waste water, Chlorine organic compounds, Performance evaluation, Degradation, Inhibition, *Phenol/chloro, Organic loading, Chemical oxygen demand.

PB94-157278/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Particle Removal and Head Loss Development in Biological Filters. Journal article.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
J. C. Goldgrabe, R. S. Summers, and R. J. Miltner. c1993, 15p EPA/600/J-94/150
Grant EPA-R-816700
Pub. in Jnl. American Water Works Association, v85 n12 p94-106 Dec 93. Prepared in cooperation with Corollo (John) Engineers, Walnut Creek, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Both prechlorinated and biological filters achieved more than one-log removal of turbidity. Effluent turbidities for the biological filters normally did not exceed 0.15 ntu and clearly did not exceed the filtered-water turbidity performance requirement of 0.5 ntu. Turbidity measurements did not indicate major performance differences between PC, BWC, and NC filters. Thus, based on turbidity measurements, biological filtration was not considered to degrade filtered-water quality.

Keywords: *Turbidity, *Water treatment, Particles, Removal, Head losses, Fluid flow, Degradation, Chlorination, Water quality, Sands, Measurement, Reprint, *Biological filters, Anthracite.

PB94-157286/REB PC **A02**/MF **A01**
Effect of Bromide Ion on Formation of HAAs during Chlorination. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
H. Pourmoghaddas, A. A. Stevens, R. N. Kinman, R. C. Dressman, and L. A. Moore. Jan 93, 8p EPA/600/J-94/149
Pub. in Jnl. American Water Works Association, v85 n1 p82-87 Jan 93. See also PB91-217919 and PB-301313. Prepared in cooperation with Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.

The concentration of bromide in raw water is a significant factor in the formation of chlorination by-products in finished drinking water. A two-block full-factorial matrix was designed to statistically evaluate the influence of bromide ion on the formation and speciation of haloacetic acids (HAAs) during chlorination and the effects of independent variables, including pH, reaction time, and chlorine dosage. Almost all of the independent variables were positively correlated with the formation of HAAs. Bromide ion was shown to shift the distribution of HAAs (as well as trihalomethanes) to more brominated species. Not only were purely brominated acetic acids formed, but also mixed bromine and chlorine species--which were measured for the first time.

Keywords: *Water treatment, *Potable water, *Bromides, *Chlorination, *Water pollution, Byproducts, Disinfection, Halomethanes, Statistical analysis, Safe Drinking Water Act, Water chemistry, Ions, pH, Reaction kinetics, Reprints, *Haloacetic acids.

PB94-157294/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Effect of Separation Processes on the Formation of Brominated THMs. Journal article.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
R. S. Summers, M. A. Benz, H. M. Shukairy, and L. Cummings. cJan 93, 10p EPA/600/J-94/148
Contract EPA-R-816700
Pub. in Jnl. American Water Works Association, v85 n1 p88-95 Jan 93. Prepared in cooperation with Bayer A.G., Leverkusen (Germany, F.R.). and Montgomery (James M.) Consulting Engineers, Inc., Pasadena, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Separation treatment processes are being investigated as a way to control the formation of disinfection by-products (DBPs) in finished waters. These processes remove natural organic matter before a disinfectant is applied, thus limiting the amount of material available to form DBPs. Four separation processes were examined in the study--granular activated carbon adsorption, powdered activated carbon adsorption, anion exchange, and membrane filtration--using two waters. Results showed that (1) as the dissolved organic carbon (DOC) decreased, the chlorination of diluted organic matter solutions held at constant bromide concentrations yielded a shift to brominated trihalomethanes (THMs); (2) at low DOC concentrations, the percentage of formed brominated trihalomethanes was higher in treated effluent than in influent water; and (3) the processes were most effective for controlling the formation of chloroform and least effective for controlling the formation of bromoform. Based on these results, it can be concluded that effective control of brominated THMs by these separation processes may be

difficult for waters containing significant concentrations of bromide.

Keywords: *Halomethanes, *Bromine organic compounds, *Water pollution control, *Potable water, *Water treatment, *Separation, Disinfection, Byproducts, Organic matter, Granular activated carbon treatment, Adsorption, Activated carbon treatment, Anion exchanging, Membranes, Filtration, Performance evaluation, Reprint.

PB94-157302/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Impact of Preozonation and Biodegradation on Disinfection By-Product Formation. Journal article.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
H. M. Shukairy, and R. S. Summers. c1992, 13p EPA/600/J-94/147
Grant EPA-R-816700
Pub. in Water Resources, v26 n9 p1217-1227 1992. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Ozonation and biological treatment were investigated as a means of controlling the formation of disinfection by-products (DBPs) as measured by total organic halides (TOX) and purgeable organic halides (POX). Organic matter from a groundwater and a river water source were used and chlorine of chloramines were used as the final disinfectant. The amount formed, the formation kinetics and the impact of disinfectant dose were investigated. Chlorination produced significantly less organic halides, especially POX, compared to chlorination. With both disinfectants and for both sources organic matter, the nonpurgeable organic halide formation rate was found to be much faster than that of POX. In all cases examined, the ratio or organic halides to dissolved organic carbon decreased after biological treatment indicating a selectivity for the potential reactive sites. Based on the results of the bench scale study, pilot studies of biological treatment for DBP control are being made. (Copyright (c) 1992 Pergamon Press Ltd.)

Keywords: *Drinking water, *Disinfection, *Ozonation, *Watr pollution abatement, Organic halogen compounds, Biodeterioration, Chlorination, Byproducts, Dosage, Reaction kinetics, Disinfectants, Humus, Ohio River, Ground water, Chloramines, Reprint, *POX(Purgeable organic halides), *TOX(Total organic halides), *MCLs(Maximum contaminant levels).

PB94-157310/REB PC **A03/MF A01**
Control of Disinfection By-Products and Biodegradable Organic Matter through Biological Treatment. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
H. M. Shukairy, R. J. Miltner, and R. S. Summers. c1993, 17p EPA/600/J-94/146
Summary in French. Pub. in Revue des Sciences de l'Eau, v5 p1-15 1993. Prepared in cooperation with Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.

The optimal use of ozonation as a pretreatment process prior to biological treatment of Ohio River water was investigated at both the bench (batch) and pilot-plant (continuous flow) scale. The study focused on disinfection byproducts (DBPs) and DBP precursor compounds and on the production of biologically stable water. Biotreatment was achieved using a bench-scale fixed-film reactor with sand acclimated to the raw Ohio River water. Ozonation was found to create a number of aldehydes, in particular formaldehyde, methyl glyoxal, glyoxal and acetaldehyde. With the exception of formaldehyde, a plateau in the aldehyde yield occurred at an ozone to total organic carbon (O3/TOC) ratio of 0,7 mg/mg, while formaldehyde increased with increasing ozone dose. After biotreatment, the concentration of aldehydes were below 1 microgram. Both ozonation and biotreatment were found to decrease the chlorine demand by up to 75% for ozonation and 55% for biotreatment. (Copyright (c) Revue Des Sciences De L'eau, 1992.)

Keywords: *Drinking water, *Disinfection, *Water treatment, *Ozonization, Reprint, Biodeterioration, Chlorination, Byproducts, Dosage, Ohio River, Aldehydes, Acetaldehyde, Formaldehyde, Glyoxal, Formation tests, Organic halogen compounds, Pilot plants, *Foreign technology, *AOC(Assimilable organic carbon), *TOX(Total organic halogen), *BDOC(Biodegradable dissolved organic carbon), TTHMs(Total trihalomethanes), THAAs(Total haloacetic acids).

PB94-157328/REB PC **A03/MF A01**
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
Modeling Substrate Transport into Biofilms: Role of Multiple Ions and pH Effects. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
J. R. V. Flora, M. T. Suidan, P. Biswas, and G. D. Sayles. c1993, 25p EPA/600/J-94/145
Pub. in Jnl. of Environmental Engineering, v119 n5 p908-930 1993. Sponsored by Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.

Steady-state substrate utilization in biofilms has traditionally been modeled by coupling Fickian diffusion with Monod reaction kinetics. An inherent assumption in most of the previous models was that the pH remains constant within the biofilm. Experiments have shown differences between the pH in the bulk solution and in the biofilm. A fundamental approach incorporating the effects of pH in any chemical or biological system involving diffusion with reaction is presented. The approach is applied to a steady-state model of substrate utilization in carbon-limited algal biofilms. (Copyright (c) ASCE 1993.)

Keywords: *Bioengineering, *Waste water treatment, *Diffusion, *Mathematical models, Aquatic algae, Electrostatic charge, Ion transport, Mass transfer, Reaction kinetics, Diffusion coefficients, pH, Ion mobility, Transport properties, Trickling filters, Thin films, Reprint, *GAC(Granular activated carbon), *Biofilms.

PB94-157336/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Fermentation Process Monitoring through Measurement of Aerosol Release. Journal article.
Cincinnati Univ., OH. Dept. of Environmental Health.
Y. L. Huang, K. Willeke, A. Juozaitis, J. Donnelly, and A. Leeson. c1994, 32p EPA/600/J-94/144
Contract EPA-68-CO-0003, Grant EPA-R-816700
Pub. in Biotechnology Progress, v10 n1 p32-38 1994. Prepared in cooperation with Battelle Memorial Inst., Columbus, OH. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Fermentation involves many complex biological processes, some of which can be difficult to monitor. In the study, aerosol measurement was explored as an additional technique for monitoring a batch aerobic fermentation process using Escherichia coli strain W3110. Using this technique, a small aerosol extraction flow from the fermentor was continuously dried inline and analyzed with an aerosol size spectrometer and an aerosol photometer, used to measure the size-integrated aerosol concentration. The increase in aerosol concentration corresponds to a decrease in the values of the measured surface tension during the same time frame. Furthermore, the aerosol size spectrometer and the photometer showed similar time traces of the effluent aerosols. As the photometer is inexpensive, it appears promising as a convenient instrument for monitoring fermentation processes. (Copyright (c) 1994 American Chemical Society and American Institute of Chemical Engineers.)

Keywords: *Industrial wastes, *Biological aerosols, *Measuring instruments, *Fermentation, Reprint, Escherichia coli, Spectrometer, Photometers, Concentration(Composition), Particle size distribution, Bioconversion, Aerobic processes, Biomass, Pollution transport, Sampling, *Aerosol release.

PB94-157344/REB PC **A05/MF A01**
Corvallis Environmental Research Lab., OR.
Improvement of Performance of Variable Probability Sampling Strategies through Application of the Population Space and the Facsimile Population Bootstrap. Technical rept.
Oregon State Univ., Corvallis. Dept. of Statistics.
W. S. Overton, and S. V. Stehman. Mar 94, 92p EPA/620/R-94/011
Also pub. as SUNY-ESF, Syracuse, NY. rept. no. TR-148. See also PB92-103449. Prepared in cooperation with Sunny-ESF, Syracuse, NY. Sponsored by Corvallis Environmental Research Lab., OR.

The paper explores design-based inference under variable probability sampling in which the inclusion probabilities, pi, are proportional to the auxiliary (design) variable x. It denotes this design as pi px, for inclusion probability proportional to x. Two pi px designs were investigated. In fixed configuration variable probability systematic (fcvps) sampling, the population is sampled in its natural or fixed ordering. If the population is sorted on x prior to sampling, the notation fcvps:x will be used. If the population ordering is randomly permuted prior to sampling, the design is randomized variable probability systematic, denoted rvps. The randomized design is often used as a model of the fixed configuration design for the purpose of variance estimation. To complete the assessment, it compares the behavior of these strategies to the performance of regression estimators under the same designs using the same variable, x. Lastly, these regression estimators are examined under simple random sampling (srs) and simple systematic sampling (sss).

Keywords: *Probability theory, *Sampling, *Population(Statistics), Mathematical models, Estimating, Statistical inference, Variance(Statistics), Regression analysis, Surveys, Tables(Data), Variable probability, FPB(Facsimile Population Bootstrap), HTDE(Horvitz-Thompson Difference Estimator).

PB94-157351/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Climatic Classification and Future Global Redistribution of Agricultural Land. Journal article.
Potsdam Inst. for Climate Impact Research, Potsdam (Germany).
W. P. Cramer, and A. M. Solomon. c30 Aug 93, 15p EPA/600/J-94/157
Grant EPA-R-817453-01-0
Pub. in Climate Research, v3 p97-110, 30 Aug 93. See also DE84012041 and DE86007397. Sponsored by Corvallis Environmental Research Lab., OR.

Future global carbon cycle dynamics under climates altered by increased concentrations of greenhouse gases (GHGs) will be defined in part by processes which control terrestrial biospheric carbon stocks and fluxes. Current research and modeling activities which involve terrestrial carbon have focussed upon the response of unmanaged vegetation to changing climate and atmospheric chemistry. A common conclusion reached from exercising geographically-explicit terrestrial carbon models is that more carbon would be stored by equilibrium vegetation controlled by a stable GHG-warmed climate than by equilibrium vegetation from current (stable) climate. Here, the authors examine the potential impact on the terrestrial carbon cycle if global agriculture increased to the limits permitted by future GHG-induced climates. The authors determined climatic limits to global agricultural zones, projected the new climatic limits to agricultural zones, then calculated the amount of carbon the terrestrial biosphere would store under the new climate and agricultural conditions. The authors conclude that loss of carbon to agriculture could be as important as gain of carbon by climate of an equilibrium biosphere. (Copyright (c) Inter-Research 1993.)

Keywords: *Farms, *Climatic changes, *Global, *Air pollution, Greenhouse effect, Gases, Atmospheric chemistry, Carbon cycle, Biosphere, Latitude, Developing countries, Vegetation, Response, Reprint.

PB94-157369/REB PC **A03/MF A01**
Modeling the Potential Change in Yield and Distribution of the Earth's Crops under a Warmed Climate. Journal article.
Corvallis Environmental Research Lab., OR.
R. Leemans, and A. M. Solomon. c1993, 19p EPA/600/J-94/158
Pub. in Climate Research, v3 p79-96 1993. Prepared in cooperation with Rijksinstituut voor de Volksgezondheid en Milieuhygiene, Bilthoven (Netherlands).

The large scale distribution of crops is largely determined by climate. The authors present the results of a climate-crop prediction model based on the U.N. Food and Agriculture Organization crop-suitability approach, implemented in a geographic information system (GIS) environment using several global environmental databases. The model utilizes daily temperature and moisture conditions to determine the properties of the growing period. Crops are characterized by their variety-specific minimum growing period requirements and photosynthesis and respiration properties. Tempera-

ture and solar radiation during the growing period control the development of each crop. The model simulates crop-specific geographic distributions by demarcating the region where productivity is possible. The model takes only non-irrigated crop productivity into account and the potential increase in productivity by technological means is not considered. The model therefore shows no crop growth along major rivers in arid, often irrigated, regions. (Copyright (c) Inter-Research 1993.)

Keywords: *Global warming, *Farm crops, *Climatic changes, Mathematical models, Forecasting, Irrigation, Atmospheric temperature, Moisture, Plant growth, Solar radiation, Photosynthesis, Respiration, Yield, Arid land, Production, Reprint.

PB94-157377/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Drinking Water Research Div.
Impact of Ozonation and Biological Treatment on Disinfection By-Products.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
H. M. Shukairy, R. S. Summers, and R. J. Miltner. 1994, 21p EPA/600/A-94/056
Grant EPA-R-816700
Presented at the International Symposium on Wastewater Treatment and Drinking Water (15th), Montreal, Canada, November 17-19, 1992. See also PB94-101888. Sponsored by Environmental Protection Agency, Cincinnati, OH. Drinking Water Research Div.

The paper summarizes several recent studies on the impact of ozonation and biological treatment on DBP formation. Ozonation was characterized by the formation of ozonation DBPs such as aldehydes, assimilable organic carbon (AOC), biodegradable dissolved organic carbon (BDOC) and the oxidation of bromide to bromate. The oxidation of the DBP precursor compounds and the effectiveness of biotreatent for the control of DBPs were monitored by the formation potential (FP) for total organic halogen (TOX), total THMs (TTHMs) and total measured haloacetic acid (THAAs). Special attention was also given to the impact of bromide concentration on the speciation of the DBPs. A specific objective of the paper was to compare DBP control by batch biological treatment at the bench-scale to that by a continuous flow sand filter at the pilot-scale.

Keywords: *Byproducts, *Water pollution control, *Water treatment, *Potable water, *Ozonation, *Biological treatment, Biodeterioration, Halomethanes, Organic matter, Disinfection, Pilot plants, Bromides, Environmental chemical substitutes, Halogen organic compounds, Bench-scale experiments, Reprint, *DBP(Disinfection By-Products), Chemical reaction mechanisms, Maximum contaminant levels, Organic carbon.

PB94-157385/REB PC **A04/MF A01**
Monitoring of Incinerator Emissions.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
L. D. Johnson. 1993, 54p EPA/600/A-94/057
See also PB-284 347 and PB93-212181.

Monitoring of Incinerator Emissions is a chapter to be included in a book entitled Hazardous Waste Incineration, edited by A. Sarofim and D. Pershing, and published by John Wiley and Sons. The chapter describes stack sampling and analysis procedures in use on hazardous waste incinerators and other waste combustion devices. Manual methods of analysis are discussed, along with continuous emission monitoring systems. Emerging technology is described, along with discussions on quality assurance/quality control (QA/QC) and sources of information and technical support. The chapter is intended for the practicing engineer involved with combustion of hazardous waste. He or she could be a plant engineer, a contractor planning a test burn, or a researcher evaluating performance of developmental or established equipment or procedures. The chapter should also be useful to a variety of other readers.

Keywords: *Air pollution monitoring, *Incineration, *Waste disposal, *Hazardous materials, Concentration(Composition), Combustion products, Quality assurance, Quality control, Volatile organic compounds, Continuous sampling, Air samplers, Performance evaluation, Design criteria.

PB94-157393/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Use of Receptor and Dispersion Modeling Principles in Assessing Pre-and Post-Abatement Conditions of an Emission Source. Conference paper Jan 92-Jun 93.
ManTech Environmental Technology, Inc., Research Triangle Park, NC.
S. Mukerjee, D. L. Fox, H. W. Ma, G. H. Crescenti, and R. K. Stevens. 1994, 18p EPA/600/A-94/058
Contract EPA-68-D0-0106
See also PB87-206504. Prepared in cooperation with North Carolina Univ. at Chapel Hill. School of Public Health. and National Oceanic and Atmospheric Administration, Rockville, MD. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Wind sector analyses, chemical mass balances (CMB) and dispersion modeling have been used to estimate the impacts of emission sources on receptor sites. The paper presents the use of these models in assessing possible changes in the ambient air impact of a biomedical waste combustor (BWC) which recently installed air pollution control devices (APCDs) as part of its air emission permit plan. Emissions inventory data for the BWC were used with the industrial source complex short-term (ISCST) dispersion model to estimate ambient air concentrations at the receptor site, which were then compared with the CMB estimates. By applying these methods at similar time frames before and after APCD installation at the BWC, it was possible to determine whether these modifications were reflected in a subsequent change in the ambient air impact on the local air shed.

Keywords: *Air pollution abatement, *Dispersions, Mathematical models, Emission, Sources, Industrial wastes, Combustion chambers, Meteorological data, Wind direction, Combustion chamber gases, *BWC(Biomedical waste combustor), CMB(Chemical mass balances), Charlotte(North Carolina).

PB94-157401/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Evaluation of a Real-Time Monitor for Particle-Bound PAH in Air.
Battelle, Columbus, OH.
N. K. Wilson, R. K. Barbour, R. M. Burton, J. C. Chuang, and M. Ramamurthi. 1994, 9p EPA/600/A-94/059
Contract EPA-68-D0-0007
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

An instrument for semi-quantitative real-time measurement of polycyclic aromatic hydrocarbons (PAH) on airborne fine particles was evaluated. The instrument operates on the principle of photoelectric ionizaton of PAH adsorbed on particle surfaces, with resulting loss of photoelectrons and subsequent measurement of the remaining positively charged particles. The authors investigated the characteristic performance of the instrument in both chamber and field studies. This performance included: selectivity for fine particles, response to PAH only on particles versus response to PAH in the vapor phase, accuracy compared to integrated sampling, interferences, rapidly of response, limits of detection, bias, ease of operation, reproducibility, calibration, reliability, and ease of field operation and maintenance. The instrument performed well and appears to be suitable for screening air for particle-bound PAH in a variety of microenvironments, as well as for use in estimating human exposure related to various activities that may generate PAH.

Keywords: *Air pollution monitoring, *Particles, *Polycyclic aromatic hydrocarbons, *Aerosols, Real time systems, Measuring instruments, Performance evaluation, Photoelectric effect, Charged particle detection, Field tests, Environmental exposure, Calibrating, Maintenance, Ionization, Concentration(Composition), Indoor air pollution, Operation, *Microenvironments.

PB94-157765/REB PC **A09/MF A03**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Evaluation of Unsaturated/Valdose Zone Models for Superfund Sites. Research rept. Oct 91-Sep 92.
Oklahoma Agricultural Experiment Station, Stillwater.
D. L. Nofziger, J. S. Chen, and C. T. Haan. Mar 94, 197p EPA/600/R-93/184
Grant EPA-R-818709
See also PB94-157773. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Mathematical models of water and chemical movement in soils are being used as decision aids for defining ground-water protection practices for Superfund sites. Numerous transport models exist for predicting movement and degradation of hazardous chemical through soils. Many of these require extensive input parameters which include uncertainty due to soil variability and unknown future weather. The impact of uncertain model parameters upon the model output is not known. Model users need an understanding of this impact so they can measure the appropriate parameters for the site and incorporate the model prediction uncertainty into their decisions. The report summarizes research findings which address the sensitivity and uncertainty of model output due to uncertain input parameters. The objective of the research was to determine the sensitivity and uncertainty of travel time, concentration, mass loading and pulse width of contaminants at the water table due to uncertainty in soil properties such as organic carbon content, bulk density, water content, and hydraulic conductivity. Chemical properties, such as organic carbon partition coefficient and degradation half-life, were also examined. The four models selected for this analysis were RITZ, VIP, CMLS and HYDRUS.

Keywords: *Hazardous materials, *Water flow, *Sediment transport, *Ground water, *Superfund, Chemical compounds, Mathematical models, Soil properties, Cleanup, Unsaturation, Concentration(Composition), Moisture content, Density(Mass/volume), Weather, Degradation, Graphs(Charts), Tables(Data), Uncertainty.

PB94-157773/REB PC **A07/MF A02**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Identification and Compilation of Unsaturated/Vadose Zone Models. Research rept. Oct 91-Sep 92.
Colorado School of Mines, Golden. International Ground Water Modeling Center.
P. K. M. van der Heijde. Mar 94, 137p EPA/600/R-94/028
Grant EPA-R-818720
See also PB94-157765. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

The present report contains the result of research and information processing activities supporting evaluation of the capabilities of various unsaturated zone flow and transport models in predicting the movement of hazardous chemical through soils to ground water. It provides an overview of major types of models applicable to problems in the unsaturated zone of the subsurface. As chemical transport in soils is often driven by the movement of water, both flow and chemical transport models are included. To manage the rapidly growing amount of information, IGWMC maintains a descriptive model information system, MARS (Model Annotation Search and Retrieval System). Detailed information on the reviewed models is presented in a series of tables.

Keywords: *Hazardous materials, *Water flow, *Sediment transport, *Ground water, *Superfund, Chemical compounds, Models, Unsaturation, Models, Information, Classifying, Moisture content, Fluid infiltration, Tables(Data), Vadose zone, MARS(Model Annotation Search and Retrieval System).

PB94-157799/REB PC **A05/MF A01**
Proceedings: Integrated Research Planning Meeting for Gulf of Mexico Estuaries. Held in Gulf Breeze, Florida on November 2-3, 1993.
Environmental Research Lab., Gulf Breeze, FL.
J. E. Harvey, and F. L. Mayer. Jan 94, 89p EPA/600/R-94/013

The report summarizes a planning meeting organized by Environmental Protection Agency (EPA) to develop and Aquatic Ecological Criteria Research Program for Gulf of Mexico estuaries. The meeting was held on November 2-3, 1993, at the EPA Environmental Re-

search Laboratory in Gulf Breeze, Florida, to develop and field test a diagnostic protocol to assess and characterize the ecological condition of Gulf of Mexico estuaries. Participants included EPA scientists and cooperators and advisors from academia, Federal and state agencies, and private corporations.

Keywords: *Aquatic ecosystems, *Estuaries, *Mexico Gulf, *Meetings, *Water pollution effects, Protocols, Ecology, Drainage, Watersheds, Guidelines, Sites, Assessments, Seasonal variations, Aquatic Ecological Criteria Research Program.

PB94-157997/REB PC A06/MF A02
Effects of the 1990 Clean Air Act Amendments on Visibility in Class I Areas: An EPA Report to Congress. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
B. V. Polkowsky. Oct 93, 116p EPA/452/R-93/014

In the report the EPA has assessed changes in regional visibility expected from implementation of the many provisions of the Clean Air Act Amendments of 1990. The report provides an estimate of future regional visibility conditions for the contiguous 48 United States, and used a layered approach to assessing visibility changes. A preliminary assessment was made choosing key locations and a simple emission driven air quality assessment to ascertain areas likely to see changes in the distribution of man-made visibility impairment related pollutants. This preliminary analysis pointed towards a more focused approach for the Eastern U.S., concentrating mostly on changes in sulfur dioxide emissions. For the Southwestern U.S., the mixture of pollutants is more varied and less dominated by sulfur particles.

Keywords: *Visibility, *Clean Air Act, *Wilderness areas, *National parks, Air quality data, Air pollution episodes, Particles, Emission, Mathematical models, Concentration(Composition), Air pollution forecasts, Acid rain, Haze, Implementation air pollution planning programs, Air quality control regions, Air pollution monitoring, Sulfur dioxide, Nitrogen compounds, Aerosols, Inventories, Maps, *NAPAP(National Acid Precipitation Assessment Program), *1990 Clean Air Act Amendments, Class I areas.

PB94-158045/REB PC A03/MF A01
North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.
Recruitment and Growth of the Eastern Oyster, 'Crassostrea virginica', in North Carolina (Includes Executive Summary). Final rept.
Duke Univ., Beaufort, NC. Marine Lab.
S. Ortega, J. P. Sutherland, and C. H. Peterson. Sep 91, 40p APES-90-08
See also PB-246 966. Prepared in cooperation with North Carolina Univ., Morehead City. Inst. of Marine Sciences. Sponsored by North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study. and Environmental Protection Agency, Research Triangle Park, NC. National Estuary Program.

During the period of 1988-1990, the authors investigated the effects of location, salinity, and depth on recruitment and growth of the eastern oyster Crassostrea virginica in Pamlico and Core Sounds, North Carolina, with the purpose of determining how the environment (location, depth, and salinity) affected oyster demography (recruitment and growth) in the coastal waters of North Carolina. It was determined that recruitment was generally greater in the high salinity sites, compared to low salinity sites. Recruitment was less at shallow depths, compared to deeper depths. In all three years the highest recruitment occurred in August and September, corresponding to the months of maximum water temperature. Recruitment was highly variable in space and time, but appeared to diminish from 1988 to 1990. Recruitment was reduced by sedimentation and a variety of sessile organisms. All sites appeared to have a similar potential for growth.

Keywords: *Coastal ecology, *Oysters, *Commercial fishing, *Harvesting, Core Sound, Pamlico Sound, North Carolina, Growth, Graphs(Charts), Crassostrea virginica.

PB94-158086/REB PC A10/MF A03
Alternative Control Techniques Document: Surface Coating of Automotive/Transportation and Business Machine Plastic Parts.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Feb 94, 209p EPA/453/R-94/017

The purpose of this document is to provide information on alternative control techniques (ACT) for volatile organic compound (VOC) emissions from the surface coating of plastic parts of automotive/transportation and business machine/electronic products. This document contains information on emissions, controls, control options, and costs that States can use in developing rules based on reasonably available control technology (RACT). The document presents options only, and does not contain a recommendation on RACT.

Keywords: *Air pollution control, *Surface coatings, *Protective coatings, Emissions, Coating processes, Paints, Alternatives, Substitutes, Automotive components, Transportation sector, Office machines, Equipment, Cost analysis, ACT(Alternative Control Techniques), Plastic parts, Volatile organic compounds.

PB94-158094/REB PC A17/MF A04
Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations. Background Information for Proposed Standards.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Feb 94, 385p EPA/453/R-93/059
See also PB86-156791.

A draft rule for the regulation of hazardous air pollutant emission from magnetic tape manufacturing operations is being proposed under the authority of sections 112, 114, 116 and 301 of the Clean Air Act, as amended in 1990. The document presents background information and the results of the national impacts assessment for the proposed rule.

Keywords: *Air pollution control, *Pollution regulations, Air pollution standards, Video tapes, Audio tapes, Magnetic tapes, Data tapes, Cassettes, Solvents, Particulates, Requirements, Alternatives, Cost analysis, Environmental impacts, Economic impact, *Magnetic recording media, Optical recording, National Emission Standards for Hazardous Air Pollutants.

PB94-158177/REB PC A05/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Rule Effectiveness Guidance: Integration of Inventory, Compliance, and Assessment Applications. Final rept.
TRC Environmental Corp., Chapel Hill, NC.
Jan 94, 94p EPA/452/R-94/001
Contract EPA-68-D3-0029
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The purpose of the document is twofold: (1) to summarize and integrate the various rule effectiveness (RE) concepts, and (2) introduce the procedures necessary to quantify SIP RE improvements for emission reduction credits. Similarities and distinctions are drawn between RE concepts and guidelines are presented for interpreting results using different RE applications. Various EPA publications which describe RE or refers to RE applications are identified.

Keywords: *Air polluton control, *Emission factors, Air pollution abatement, Air pollution standards, Standards compliance, Pollution regulations, Stationary pollutant sources, Requirements, Estimates, Trends, Inspections, Forecasting, *Rule effectiveness, Emission reduction credits, State implementation plans, Emission inventories, National Ambient Air Quality Standards.

PB94-158235/REB PC A10/MF A03
General Provisions for 40 CFR Part 63: National Emission Standards for Hazardous Air Pollutants for Source Categories, 1994. Background Information for Promulgated Regulation.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Feb 94, 217p EPA/450/3-91/019B
See also PB93-226090.

General Provisions are being promulgated for 40 CFR Part 63 (a new part) which will include national emission standards for hazardous air pollutants (NESHAP) for source categories to be established pursuant to Section 112 of the Clean Air Act Amendments of 1990 (CAAA). The promulgated general provisions eliminate the need to repeat general information and requirements within these standards; they include 'generic' information, such as definitions of terms, and sections that spell out the administrative responsibilities of EPA and the compliance responsibilities of owners or operators who are subject to a relevant emission standard or other requirement. The document contains a summary of changes to the rule since proposal and a summary of the public comments on the proposed rule and EPA's responses.

Keywords: *Air pollution abatement, *Hazardous materials, *Air pollution standards, *Pollution regulations, Air pollution monitoring, Administrative procedures, Stationary sources, Pollution sources, Appropriate technology, Records management, Notification procedures, Best available technology, New source performance standards, Compliance, Requirements, Fugitive emissions, Combustion products, Public opinion, Clean Air Act Amendments of 1990.

PB94-158391/REB PC A05/MF A01
Environmental Protection Agency, Ann Arbor, MI. Emission Planning and Strategies Div.
Characterization of 49-State Vehicles in California. Technical memo.
TRC Environmental Corp., Chapel Hill, NC.
30 Apr 93, 95p
Contract EPA-68-DO-0121
Sponsored by Environmental Protection Agency, Ann Arbor, MI. Emission Planning and Strategies Div.

The purpose of this report is to summarize the efforts which have been made to characterize the 49-state vehicle population in California and in each of the Federal Implementation Plan (FIP) areas. The original intent of characterization of the 49-state vehicle population was to provide a basis to develop measures to limit the use of or emission rates of 49-state vehicles, which in turn will reduce volatile organic compounds (VOC), carbon monoxide (CO), and nitrogen oxide (NOx) emissions from vehicles in the FIP areas. Since VOC and NOx standards for these vehicles are less stringent than those for California vehicles, one of the purposes of this effort is to determine if emission reductions from 49-state vehicles could significantly contribute to achieving attainment through the FIPs.

Keywords: *California, *Air pollution abatement, *Motor vehicles, *Exhaust emissions, Air quality, Volatile organic compounds, Carbon monoxide, Nitrogen oxides, Air pollution standards, Pollution laws, Pollution regulations, Clean Air Acts, Inspection, Maintenance, Fossil fuels, Federal Implementation Plan.

PB94-158425/REB PC A06/MF A02
Environmental Protection Agency, Ann Arbor, MI. Emission Planning and Strategies Div.
Technical Support Information for the Development of Heavy Duty Diesel Vehicle Rules for the California Federal Implementation Plans. Technical memo.
TRC Environmental Corp., Chapel Hill, NC.
30 Apr 93, 103p
Contract EPA-68-D0-0121
See also PB85-234920. Sponsored by Environmental Protection Agency, Ann Arbor, MI. Emission Planning and Strategies Div.

The purpose of this report is to gather information to use in the development of technical support documentation for the preparation of regulations to control exhaust emissions from heavy duty diesel vehicles in the California Federal Implementation Plan (FIP) areas. This report identifies the State, Federal, and local regulations for reducing oxide of nitrogen (NOx) emissions. The report also identifies the various control strategies for reducing the overall NOx emissions inventory. The control strategies include both technological methods (vehicle emission control systems) as well as the types of strategies related to limiting the activity level of heavy duty diesel vehicles.

Keywords: *California, *Air pollution abatement, *Diesel engine exhaust, *Heavy duty vehicles, *Pollution regulations, Exhaust emissions, Air pollution control, Nitrogen oxides, Benefit cost analysis, Study esti-

mates, Diesel engines, Fossil fuels, Federal Implementation Plan.

PB94-158615/REB PC **A03/MF A01**
Impact of pH and Lead Composition on Metal Leached from Brass Coupons.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
D. A. Lytle, and M. R. Schock. 1993, 43p EPA/600/A-94/035
Pub. in Proceedings of the American Water Works Association Annual Conference, San Antonio, TX., June 6-10, 1993, p899-943.

Water sampling and monitoring requirements under the Lead and Copper Rule specify one liter samples taken at the consumers tap following at least 6 hours of stagnation. Probable direct sources of lead in the one liter water volume are lead/tin solder and brass fixtures. Brass ranges in metal composition depending on its application. Composite metal ranges in brass are roughly 60-80% copper, 4-32% zinc, 2-8% lead, less than 6% tin, and trace amounts of iron. There is little information and understanding of the relation between water quality effects on metal leaching and the metal composition of the brass. Initial work by British researchers indicated that the amount of lead leached from the brass is independent of the percentage of lead in the brass.

Keywords: *Metals, *Leaching, *Brass, *Water pollution effects, Lead(Metal), Concentration(Composition), Water pollution sampling, Corrosion, Exposure, Surfaces, Plumbing, Corrosion, Piping systems, Safety, Phosphates, Reprint, Safe Drinking Water Act and Amendments of 1986.

PB94-158623/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Model Engineering Concepts for Air Quality Models in an Integrated Environmental Modeling System. Symposium paper.
MCNC, Research Triangle Park, NC. Information Technologies Div.
C. Coats, A. F. Hanna, D. Hwang, and D. W. Byun. 1993, 13p EPA/600/A-94/036
Contract EPA-68-01-7365, Grant EPA-R-816496
Prepared in cooperation with Computer Sciences Corp., Research Triangle Park, NC. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Models-3 is an extensible environmental modeling system designed to meet the research and regulatory needs of the EPA and other users into the twenty-first century. As such, it must deal with a number of problems. These problems include (1) the scientific correctness, flexibility, and usability required, (2) automating much of the complexity of planning, scheduling, and management of the computations associated with environmental studies and the massive volumes of data these studies produce, and (3) the software engineering issues associated with developing a modular, scalable, extensive family of air quality models to be provided by the Models-3 system to its users. The paper is concerned with the last of these, the model engineering problem.

Keywords: *Environmental engineering, *Environment models, *Mathematical models, *Air quality data, Environmental management, Automation, Project planning, Scheduling, Accuracy, USEPA, Modules, RADM Engineering models.

PB94-158631/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Importance of the Nitrous Oxide Pathway to NOx in Lean-Premixed Combustion. Rept. for Oct 91-May 93.
Washington Univ., Seattle. Dept. of Mechanical Engineering.
D. G. Nicol, R. C. Steele, N. M. Marinov, and P. C. Malte. c1993, 13p EPA/600/A-94/037
Presented at the International Gas Turbine and Aeroengine Congress and Exposition, Cincinnati, OH., May 24-27, 1993. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper reports results of a study addressing the importance of the different chemical pathways responsible for nitrogen oxides (NOx) formation in lean-premixed combustion, and especially the role of the nitrous oxide pathway relative to the traditional Zeldovich pathway. The primary zone, of uniform fuel/air ratio, is modeled as a micromixed well-stirred reactor, representing the flame zone, followed by a series of plug flow reactors, representing the post-flame zone. The fuel is methane. Verification of the model is based on the comparison of its NOx output to experimental results published for atmospheric pressure jet-stirred reactors and for a 10 atm porous-plate burner. Good agreement between the modeled results and the measurements is obtained for most of the jet-stirred reactor operating range.

Keywords: *Gas turbine engines, *Methane, *Combustion products, *Pollution control, Nitrogen oxides, Path of pollutants, Jet engines, Atmospheric pressure, Stationary sources, Reprint, Jet stirred reactors, Zeldovich pathway, Nitrous oxide.

PB94-158649/REB PC **A03/MF A01**
Oxidative Coupling of Phenolics on the GAC Surface. Proceedings 1990-93.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. D. Vidic, M. T. Suidan, and R. C. Brenner. c1992, 12p EPA/600/A-94/038
Pub. in Proceedings of the Water Environment Federation Annual Conference and Exposition (65th), New Orleans, LA., September 20-24, 1992, p1-12. Prepared in cooperation with Pittsburgh Univ., PA. and Cincinnati Univ., OH.

Previously reported results by the authors revealed that the presence of molecular oxygen (oxic conditions) in the test environment can, in some instances, cause an almost threefold increase in the adsorptive capacity of granular activated carbon (GAC) for phenolic compounds. It was discovered that these compounds undergo oxidative coupling on the carbon surface under oxic conditions. The polymers formed as a result of these chemical reactions are very difficult to desorb from the surface of GAC. This led to significant irreversible adsorption in the presence of molecular oxygen. On the other hand, when the same compounds are adsorbed on the carbon surface under anoxic conditions, essentially all of the adsorbate can be recovered from the carbon surface by solvent extraction. (Copyright (c) 1992 Water Environment Federation.)

Keywords: *Phenols, *Activated carbon, *Activated carbon treatment, *Water pollution control, Adsorption, Polymerization, Chemical reactions, Oxidation reduction reactions, Particle size, Anoxia, Drinking water, Odors, Groundwater, Reprint, Granular activated carbon, Molecular oxygen.

PB94-158656/REB PC **A03/MF A01**
Anaerobic Treatment of High-Strength Industrial Wastes Bearing Semi-Volatile RCRA Compounds. Proceedings 1988-91.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
B. Narayanan, M. T. Suidan, A. B. Gelderloos, and R. C. Brenner. c1992, 15p EPA/600/A-94/039
Pub. in Proceedings of the Water Environment Federation Annual Conference and Exposition (65th), New Orleans, LA., September 20-24, 1992, p1-12. Prepared in cooperation with Corollo (John) Engineers, Walnut Creek, CA., Cincinnati Univ., OH., and Pirnie (Malcolm), Inc., Newport News, VA.

The potential of the anaerobic, expanded-bed, granular activated carbon (GAC) reactor in treating a high-strength waste containing RCRA semivolatile organic compounds was studied. Six semivolatiles, orthochlorophenol, nitrobenzene, naphthalene, para-nitrophenol, lindane, and dibutyl phthalate, were fed to the reactor in a high-strength matrix of background solvents consisting of acetate, acetone, and methanol. Performance was evaluated over a period of 530 days. The reactor was found to effect complete removals of all the semivolatile compounds with the exception of orthochlorophenol. Removal of orthochlorophenol ranged from 77 percent to 99 percent. Removal of all the semivolatiles was elucidated relative to adsorption and biodegradation. With the exception of naphthalene, which was found to be completely removed by adsorption, all the other semivolatiles were removed primarily by biodegradation. COD removals in excess of 90 percent were also observed throughout the study. (Copyright (c) 1992 Water Environment Federation.)

Keywords: *Anaerobic processes, *Volatile organic compounds, *Activated carbon treatment, *Industrial wastes, Naphthalene, Lindane, Nitrophenol, Nitrobenzene, Adsorption, Removal, Chemical oxygen demand, Biodegradation, Tables(Data), *Semivolatile organic compounds, Granular activated carbon.

PB94-158664/REB PC **A03/MF A01**
Effect of GAC Characteristics on Adsorption of Organic Pollutants. Proceedings 1990-93.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
G. A. Sorial, M. T. Suidan, R. D. Vidic, and R. C. Brenner. c1994, 18p EPA/600/A-94/040
Pub. in Proceedings of the Annual Water Pollution Control Federation Conference and Exposition (64th), Toronto, Ontario, October 7-10, 1991, p1-15. Prepared in cooperation with Cincinnati Univ., OH. and Pittsburgh Univ., PA.

The impact of the characteristics of granular activated carbon (GAC) on adsorption capacity and on the potential for polymerization of phenolic compounds on the surface of GAC in the presence of molecular oxygen is evaluated in the study. Adsorption isotherm data were collected for p-chlorophenol on five activated carbons, three manufactured from bituminous coal, one manufactured from lignite coal, and one manufactured from wood. These isotherms were collected under anoxic (absence of molecular oxygen) and oxic (presence of molecular oxygen) conditions. Higher extraction efficiencies of the carbons used in the oxic isotherms were obtained for the carbons that exhibited lower increases in capacities when compared to anoxic isotherms. (Copyright (c) 1991 Water Pollution Control Federation.)

Keywords: *Activated carbon treatment, *Phenols, *Water pollution control, Adsorption, Removal, Production, Petroleum products, Residues, Coal, Surfaces, Isotherms, Anoxia, Reprint, Granular activated carbon.

PB94-158672/REB PC **A03/MF A01**
Molecular Oxygen and the Adsorption of Phenols: Effect of Functional Groups. Proceedings 1990-93.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. D. Vidic, M. T. Suidan, R. C. Brenner, and G. A. Sorial. c1993, 15p EPA/600/A-94/041
Pub. in Proceedings of the Water Pollution Control Federation Annual Conference and Exposition (64th), Toronto, Ontario, October 7-10, 1991, p1-13. See also PB94-113776. Prepared in cooperation with Cincinnati Univ., OH. and Pittsburgh Univ., PA.

The study reveals that the presence of molecular oxygen (oxic conditions) has a significant impact on the exhibited adsorptive capacity of granular activated carbon (GAC) for several phenolic compounds. The increase in the GAC adsorptive capacity under oxic condition results from polymarization of these adsorbates on the carbon surface. The mechanism of polymer formation is through oxidative coupling of phenolic molecules. The extent of an increase in the GAC adsorptive capacity is in accordance with the ease of oxidation of these compounds. However, substituting a nitro group on the parent phenol molecule suppressed polymerization reactions, and no increase in the GAC adsorptive capacity was observed under oxic conditions for these substituents.

Keywords: *Oxygenation, *Phenols, *Adsorption, *Granular activated carbon treatment, *Water pollution control, *Polymerization, Best technology, Nitro compounds, Sewage treatment, Industrial waste treatment, Performance evaluation, Extraction, Isotherms, Surface chemistry, Reprints.

PB94-158680/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Field Test and Validation of a Source Test Method for Methylene Diphenyl Diisocyanate. Symposium paper.
Radian Corp., Research Triangle Park, NC.
F. W. Wilshire, J. E. Knoll, J. F. McGaughey, and S. C. Foster. 1994, 14p EPA/600/A-94/042

Contract EPA-68-D1-0010
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Four isocyanates are listed for regulation in the Clean Air Act Amendments of 1990: hexamethylene-1,6 diisocyanate, methylene diphenyl diisocyanate, and 2,4-toluene diisocyanate, each of which is used in the production of polymers, and methyl isocyanate which is an intermediate in the manufacture of insecticides. To support projected regulations, a study is under way to produce a source sampling and analysis method for the four pollutants cited above. In the procedure under development, the isocyanates are collected in a modified Method 5 sampling train and stabilized with a derivatizing reagent, 1-(2-pyridyl)piperazine in toluene. Derivatized samples are then returned to the laboratory and analyzed by High Performance Liquid Chromatography with UV detection (HPLC-UV). An isocyanate generator was developed in the laboratory to provide isocyanate atmospheres for optimizaton of sampling parameters and chromatographic conditions. The accuracy and precision of the method is determined in the field using train spiking and multiprobe sampling techniques, following the procedures outlined in EPA Method 301.

Keywords: *Isocyanates, *Sources, *Disocyanate, *Air pollution control, Toluene, Nirogen organic compounds, Field tests, Regulations, Sampling, Chemical analysis, Chromatographic analysis, Ultraviolet detection, Laboratories, Reprint, Methylene diphenyl diisocyanate.

PB94-158698/REB PC **A03/MF A01**
Analysis of Regional Visibility in the Eastern United States Using Aerosol Models. Conference paper.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
A. F. Hanna, F. S. Binkowski, and U. Shankar. 1994, 19p EPA/600/A-94/043
Prepared in cooperation with MCNC, Research Triangle Park, NC. Information Technologies Div. and National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Air Resources Lab.

Visibility has traditionally been calculated using the Koschmieder formula that relates the distance at which a black object can just be distinguished against the horizon to the extinction coefficient of the assumed homogeneous air path between the object and observer. The light extinction coefficient is the sum of the medium's absorption and scattering coefficients. The components of light extinction include light scattering by air molecules (Rayleigh scattering) and by particles (Mie scattering), and light absorption by gases and by particles. Scattering by particles is the dominant component of light extinction. The authors demonstrate the use of accurate and approximate methods for calculating light extinction to estimate regional visibility. Concentrations of sulfates, which are known to be the major contributors to visibility degradation in the eastern United States, are simulated using the Regional Particulate Model (RPM).

Keywords: *Aerosols, *Visibility, *Air pollution, *United States, Mathematical models, Particulates, Light scattering, Absorption, Sulfates, Degradation, Gases, Rayleigh scattering, Eastern Region(United States), Koschmieder formula, Regional Particulate Model.

PB94-158706/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
U.S. Visibility Trends, 1960-1992. Symposium paper.
Washington Univ., St. Louis, MO. Center for Air Pollution Impact and Trend Analysis.
R. B. Husar, and J. B. Elkins. 1994, 18p EPA/600/A-94/044
See also AD-A065 509. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The U.S. haze patterns and trends since 1960 are presented in 16 haze maps that represent four time periods and four seasons. The selected time periods are 5 year averages centered at 1960, 1970, 1980, and 1990. The quarters are calendrical. The discussion will encompass the overall national pattern and trends.

Keywords: *United States, *Haze, *Visibility, Reprint, Air pollution monitoring, Air pollution sources, Regional analysis, Atmospheric optics, Emission factors, Air circulation, Seasonal variations, Spatial variations, Trends.

PB94-158714/REB PC **A02/MF A01**
Salinity and Temperature Effects on Chronic Toxicity of 2,4-Dinitrophenol and 4-Nitrophenol to Sheepshead Minnows ('Cyprinodon variegatus'). Journal article.
Environmental Research Lab., Gulf Breeze, FL.
T. K. Linton, F. L. Mayer, T. L. Simon, J. A. Malone, and L. L. Marking. c1994, 8p EPA/600/J-94/127
Pub. in Environmental Toxicology and Chemistry, v13 p85-92 1994. Prepared in cooperation with University of West Florida, Pensacola. Dept. of Biology., McMaster Univ., Hamilton (Ontario)., and National Fisheries Research Center, La Crosse, WI.

Toxicity tests (28-d early-life-stage) were conducted to determine the effects of nine combinations of salinity (15, 20, 25 ppt) and temperature (22, 27, 32C) on the toxicity of 2,4-dinitrophenol (2,4-DNP) and 4-nitrophenol (4-NP) to sheepshead minnows (Cyprinodon variegatus). The highest tested concentration having no observed effect (NOEC) on mortality and growth was derived weekly. The NOECs at test termination indicated that the survival and growth of fish exposed to 2,4-dinitrophenol were not significantly affected by salinity, temperature, or the salinity temperature interaction. However, 28-d NOECs of fish surviving from 4-nitrophenol exposures were significantly affected by temperature, but the highest value exceeded the lowest by only a factor of two. The overall data suggest that variations of salinity and temperature do not change the NOEC; only the exposure time required to attain the same NOEC is altered.

Keywords: *Salinity, *Temperature, *Nitrophenols, *Water pollution effects(Animals), Toxicity, Growth, Mortality, Reprint, *Cyprinodon variegatus.

PB94-158722/REB PC **A02/MF A01**
Effects of Water Temperature on the Toxicity of 4-Nitrophenol and 2,4-Dinitrophenol to Developing Rainbow Trout ('Oncorhynchus mykiss'). Journal article.
Environmental Research Lab., Gulf Breeze, FL.
G. E. Howe, L. L. Marking, T. D. Bills, M. A. Boogaard, and F. L. Mayer. c1994, 8p EPA/600/J-94/128
Pub. in Environmental Toxicology and Chemistry, v13 p79-84 1994. Prepared in cooperation with National Fisheries Research Center, La Crosse, WI.

Early-life-stage (ELS) toxicity tests were conducted to determine the effect of selected water temperatures on the toxicity of 4-nitrophenol and 2,4-dinitrophenol to rainbow trout (Oncorhynchus mykiss). NOECs were determined for growth and mortality at selected time intervals and water temperatures of 7, 12, and 17C. As tests progressed, NOECs leveled to constant time-independent values that were similar for tests at each temperature. In 4-nitrophenol tests, the time-independent NOEC values at 7, 12, and 17C, respectively, were 1.16, 1.20, and 1.16 mg/L for growth and 3.40, 3.38, and 2.20 mg/L for mortality. For 2,4-dinitrophenol, time-independent NOEC values at 7, 12, and 17C, respectively, were 1.07, 0.50, and 0.80 mg/L for growth and 1.30, 1.89, and 1.60 mg/L for mortality. Temperature did, however, affect the rate at which time-independent NOECs were reached. More time was required to reach time-independent NOECs at temperature decreased. For example, the time-independent NOEC in 4-nitrophenol tests at 17C was reached in 14 d, whereas it required 42 d at 7C. The effect of temperature on toxicity must be considered in hazard assessment protocols to assess risk accurately and protect aquatic organisms adequately. Chronic toxicity tests are necessary to assess risk because acute toxicity tests cannot provide the information necessary to predict the long-term effects of factors such as temperature in natural environments.

Keywords: *Temperature, *Trout, *Water pollutant effects(Animals), *Nitrophenols, Reprint, Growth, Toxicity, Mortality, Dose-response relationships, *Oncorhynchus mykiss.

PB94-158730/REB PC **A03/MF A01**
Acute Toxicity of 4-Nitrophenol, 2,4-Dinitrophenol, Terbufos and Trichlorfon to Grass Shrimp ('Palaemonetes' spp.) and Sheepshead Minnows ('Cyprinodon variegatus') as Affected by Salinity and Temperature. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
J. A. Brecken-Folse, F. L. Mayer, L. E. Pedigo, and L. L. Marking. c1994, 13p EPA/600/J-94/126
Pub. in Environmental Toxicology and Chemistry, v13 p67-77 1994. Prepared in cooperation with National Fisheries Research Center, La Crosse, WI. and Florida State Dept. of Health and Rehabilitative Services, Krawfordville.

Toxicities of 2 industrial chemicals (4-nitrophenol and 2,4-dinitrophenol) and two organophosphate insecticides (terbufos and trichlorfon) to juvenile grass shrimp (Palaemonetes spp.) and sheepshead minnows (Cyprinodon variegatus) were determined by static, 96-h toxicity tests in a factorial design with 12 combinations of salinity and temperature (15, 20, 25, 30 ppt x 17.22 72C). Concentrations of the toxicants, including bioconcentration, were determined as appropriate by gas or liquid chromatography and the use of (14)C-labled compounds. The 96-h LC50s for 4-nitrophenol ranged from 12 to 31 mg/L and for 2,4-dinitrophenol from 13 to 50 mg/L. Toxicity decreased as salinity increased for 2,4-dinitrophenol and sheepshead minnows, but toxicity to grass shrimp increased as salinity increased. Toxicity decreased with increased temperature for grass shrimp exposed to 2,4-dinitrophenol and sheepshead minnows exposed to 4-nitrophenol, and no change was observed for grass shrimp exposed to 4-nitrophenol. Bioconcentration increased as concentration increased. The 96-h LC50s for terbufos ranged from 3.4 to 6.6 micrograms/L and for trichlorfon, from 6.3 to 19,300 micrograms/L. Terbofus and trichlorfon toxicity to grass shrimp and sheepshead minnows increased with increased temperature. Bioconcentration factors for terbufos were greater in sheepshead minnows than grass shrimp, but were reversed for trichlorfon.

Keywords: *Water pollution effects(Animals), *Nitrophenols, *Trichlorfon, Toxicity, Temperature, Salinity, Reprint, *Terbufos, *Pala emonetes, *Cyprinodon variegatus.

PB94-158748/REB PC **A03/MF A01**
Effects of Water Temperature and pH on Toxicity of Terbufos, Trichlorfon, 4-Nitrophenol and 2,4-Dinitrophenol to the Amphipod 'Gammarus pseudolimnaeus' and Rainbow Trout ('Oncorhynchus mykiss'). Journal article.
Environmental Research Lab., Gulf Breeze, FL.
G. E. Howe, L. L. Marking, T. D. Bills, J. J. Rach, and F. L. Mayer. c23 Mar 93, 16p EPA/600/J-94/125
Pub. in Environmental Toxicology and Chemistry, v13 p51-66 1994. Prepared in cooperation with National Fisheries Research Center, La Crosse, WI.

Water temperature and pH affect the toxicity of most chemicals to aquatic organisms. The objectives of the study were to determine: (1) individual and interactive effects of water temperature (7, 12, 17C), pH (6.5, 7.5, 8.5, 9.5), and time on the acute toxicity of terbufos, trichlorfon, 4-nitrophenol, and 2,4-dinitrophenol to rainbow trout (Oncorhynchus mykiss) and the amphipod Gammarus pseudolimnaeus; (2) individual and interactive effects of water temperature and pH on chemical bioconcentration in acute tests with rainbow trout and Gammarus exposed to terbufos, 4-nitrophenol, and 2,4-dinitrophenol. The toxicity of all four chemicals was significantly affected by pH in all tests except for Gammarus exposed to terbufos. Temperature significantly affected toxicity of all chemicals to both species. Toxicity increased with temperature in all tests except for rainbow trout exposed to nitrophenol. Significant interactive effects between toxicity modifying factors were observed in nearly all tests. Temperature and pH effects on chemical toxicity need to be considered in chemical hazard assessment to ensure adequate protection of aquatic organisms.

Keywords: *Trout, *Temperature, *pH, *Nitrophenols, *Trichlorfon, *Water pollution effects(Animals), Time factors, Reprint, *Terbufos, Onchorhynchus mykiss, Gammarus pseudolimnaeus.

PB94-158755/REB PC **A03/MF A01**
Relationships between Descriptors for Hydrophobicity and Soft Electrophilicity in Predicting Toxicity. Journal article.
Environmental Research Lab.-Duluth, MN.
O. G. Mekenyan, and G. D. Veith. c1993, 12p EPA/600/J-94/124
Pub. in SAR and QSAR in Environmental Research, v1 p335-344 1993. Prepared in cooperation with Burgas Univ. of Technology (Bulgaria). Dept. of Physical Chemistry.

The toxicity of chemicals is orthogonal with individual molecular descriptors used to quantify hydrophobicity and soft electrophilicity when considering large data sets. Estimating the toxicity of reactive chemicals requires descriptors of both passive transport and the stereoelectronic interaction, which are largely independent processes. QSARs using either log P or an electronic parameter alone are only significant for sets of chemicals that represent special, albeit some important, cases in QSAR. Chemicals were clustered according to their reactivity as soft electrophiles by defining isoelectrophilic windows along the toxicity response surface. Within these narrow windows of reactivity, the variation of toxicity was explained by the variation of log P. The authors observed that the dependence of toxicity on log P in different isoelectrophilic windows decreased as reactivity increased. The data are consistent with toxicity models where competing nucleophilic sites are distributed along the transport route of the chemicals. (Copyright (c) 1993 Gordon and Breach Science Publishers S.A.)

Keywords: *Toxicity, Structure-activity relationships, Reprint, *Electrophilicity, *Hydrophobicity.

PB94-158763/REB PC **A03/MF A01**
Association of Personal and Workplace Characteristics with Health, Comfort and Odor: A Survey of 3948 Office Workers in Three Buildings. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
L. A. Wallace, C. J. Nelson, R. Highsmith, and G. Dunteman. cJun 92, 14p EPA/600/J-94/123
Pub. in Indoor Air, v3 p193-205 1993. Prepared in cooperation with Research Triangle Inst., Research Triangle Park, NC.

A questionnaire on health symptoms, workplace conditions, and perceived indoor air quality was administered to 3948 employees of the Environmental Protection Agency in Washington, DC in the winter of 1989. The main goal was to determine the personal or workplace characteristics associated with health symptoms. A principal components analysis of 32 health symptoms identified 12 health factors. Each factor was generally associated with a particular body system (eyes, nose, throat, chest, central nervous system, etc.). The 12 health factors were regressed linearly on the 50-100 personal, workplace, and spatial characteristics identified from the questionnaire and building blueprints. Significant variables ($p < 0.01$) were included in a second logistic regression to determine a final model.

Keywords: *Office buildings, *Indoor air pollution, *Occupational safety and health, Reprint, Work environments, Health effects, Air pollution effects(Humans), Irritants, Odors, Comfort, Fungi, Dust, Occupational exposure, Sensitivity, Principal component analysis, Environmental surveys, Sick building syndrome.

PB94-158771/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Experiments on Wave Breaking in Stratified Flow over Obstacles. Journal article.
Surrey Univ., Guildford (England). Dept. of Mechanical Engineering.
I. P. Castro, and W. H. Snyder. c1993, 19p EPA/600/J-94/122
Grant EPA-R-817931
Pub. in Jnl. of Fluid Mechanics, v255 p195-211 1993. 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.

Towing-tank experiments on linearly stratified flow over three-dimensional obstacles of various shapes are described. Particular emphasis is given to the parameter regimes which lead to wave-breaking aloft, the most important of which is the Froude number, the Brunt-Vaisala frequency and the hill height, respectively. The effects of other parameters and the spanwise and longitudinal aspect ratios of the hill, on wave breaking are also demonstrated. It is shown that the Froude number range over which wave breaking occurs is generally much more restricted than the predictions of linear (hydrostatic) theories would suggest; nonlinear (Long's model) theories are in somewhat closer agreement with experiments. The results also show that a breaking wave aloft can exist separately from a further recirculating region downstream of the hill under a second lee wave, but that under certain circumstances these can interact to form a massive turbulent zone whose height is much greater than h. Previous theories only give estimates for the upper critical Froude number, below which breaking occurs; the experiments also reveal lower critical values, below which there is no wave breaking.

Keywords: *Stratified flow, *Ocean waves, Wave propagation, Three dimensional flow, Froude number, Breaking, Vortices, Flow visualization, Water waves, Fluid dynamics.

PB94-158789/REB PC **A03/MF A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Field Trapping of Subsurface Vapor Phase Petroleum Hydrocarbons. Journal article.
ENSR Consulting and Engineering, Acton, MA.
E. E. Moyer, D. W. Ostendorf, D. H. Kampbell, and Y. Xie. c1994, 11p EPA/600/J-94/121
Contract EPA-R-816821
Pub. in Ground Water Monitoring Review, p110-119 Winter 1994. Prepared in cooperation with Massachusetts Univ., Amherst. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Soil gas samples from intact soil cores were collected on adsorbents at a field site, then thermally desorbed and analyzed by laboratory gas chromatography (GC). Vertical concentration profiles of predominant vapor phase petroleum hydrocarbons under ambient conditions were obtained for the zone directly above the capillary fringe. Water and residual phase weathered aviation gasoline were present in this region of the profile. The sampling, trapping, and GC methodology was effective in most respects. Reproducibility, trapping, and desorption efficiency were generally satisfactory, and different sorbent tubes gave similar results.

Keywords: *Land pollution, *Hydrocarbons, *Trapping, *Aviation gasoline, Soil gases, Petroleum products, Air pollution sampling, Gas analysis, Oil pollution, Emission, Vapor phases, Soil contamination, Desorption, Coring, Gas chromatography, Subsurface investigations, Sorbents, Ground water, Reprint, *Vertical profile, Traverse City(Michigan).

PB94-158797/REB PC **A02/MF A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Use of Cationic Surfactants to Modify Soil Surfaces to Promote Sorption and Retard Migration of Hydrophobic Organic Compounds. Journal article.
Oregon State Univ., Corvallis. Dept. of Chemistry.
J. Wagner, H. Chen, B. J. Brownawell, and J. C. Westall. c1994, 10p EPA/600/J-94-120
Grant EPA-R-816875
Pub. in Environmental Science and Technology, v28 n2 p231-237 1994. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Cationic surfactants can be used to modify surfaces of soils and subsurface materials to promote adsorption of hydrophobic organic compounds (HOC). Batch and column experiments were performed to investigate the phenomenon with the cationic surfactant dodecylpyridinium (DP), a series of chlorobenzenes as representative HOC, and a low organic carbon aquifer material (Lula). The adsorption isotherm of DP was highly nonlinear; at micromolar concentrations, DP was adsorbed strongly but not irreversibly; at millimolar concentrations, adsorption was relatively weak. Distribution ratios of the chlorobenzenes varied nonlinearly with DP loading. The elution of chlorobenzenes from columns packed with DP-treated aquifer material was examined; a transport model based on the results of the batch experiments and the local equilibrium assumption yielded an acceptable approximation for the coelution of DP and HOC from the column. It is concluded that treatment of surfaces with cationic surfactants shows promise as a means of promoting HOC sorption in a variety of treatment processes. (Copyright (c) 1994 American Chemical Society.)

Keywords: *Environmental transport, *Land pollution, *Surfactants, *Cations, *Soil treatment, *Immobilization, Reprint, Remedial action, Adsorption, Aquifer materials, Surfaces, Organic compounds, Feasibility studies, *Hydrophobic organic compounds, Pyridinium/dodecyl.

PB94-158805/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
U.S. Mercury Recyclers Provide Expanded Process Capabilities. Journal article.
Hazen Research, Inc., Golden, CO.
P. B. Queneau, L. A. Smith, and M. D. Royer. cFeb 94, 7p EPA/600/J-94/119
Contract EPA-68-CO-0003
Pub. in HAZMAT WORLD, p31-34 Feb 94. Prepared in cooperation with Battelle, Columbus, OH. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The article summarizes the treatment capabilities of U.S. plants recovering mercury from a variety of secondaries. There are six non-captive U.S. operations that accept various types of mercury-containing secondaries and wastes for mercury recovery, not including those firms specializing in processing spent lamps. Two of these operations, Adrow Chemical and D.F. Goldsmith Metal and Chemical, specialize in distillation of $>$ or $=$ 99% flowable mercury; non-radioactive mercury assaying $>$ or $=$ 99% Hg is not a listed waste. One operation, Quicksilver Recycling, operates a physical separation circuit followed by distillation; the company's feedstock is primarily electronic scrap. Two firms, Bethlehem Apparatus and Mercury Refining, accept a wide variety of mercury secondaries and wastes for retorting and/or distillation. The only domestic recycler of radioactive mercury materials is NSSI/Recovery Services.

Keywords: *Mercury(Metal), *Waste recycling centers, *Technology utilization, Reprint, Metal recycling, Waste processing plants, Materials recovery, Separation processes, Distillation, Refining, Retorting, Waste treatment.

PB94-158821/REB PC **A03/MF A01**
Environmental Research Lab., Athens, GA. Office of Research and Development.
Investigation of the Electrostatic Properties of Humic Substances by Fluorescence Quenching. Journal article.
Woods Hole Oceanographic Institution, MA. Dept. of Chemistry.
S. A. Green, F. M. M. Morel, and N. V. Blough. 1992, 10p EPA/600/J-93/521
Grant EPA-R-815293
Pub. in Environmental Science and Technology, v26 n2 p294-302 Feb 92. Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering. Sponsored by Environmental Research Lab., Athens, GA. Office of Research and Development.

A fluorescence quenching technique was employed to explore the electrostatic properties of fulvic acid (FA) and humic acid (HA). Cationic nitroxides were found to be up to 16 times more effective than neutral analogues in quenching the fluorescence of humic materials. The result is attributed to the enhanced Coulombic attraction of cations to the anionic FA or HA surface and is interpreted as an estimate of surface potential. Reduction of molecular charge at low pH and shielding of charge at high ionic strength produced diminished enhancements, consistent with this interpretation. High molecular weight fractions of HA have a higher apparent surface potential than lower molecular weight fractions, indicating that larger humic molecules may have an enhanced ability to bind metal ions. (Copyright (c) 1992 American Chemical Society.)

Keywords: *Electrostatics, *Humic acid, *Fulvic acid, *Environmental effects, *Humus, Reprint, Decomposing organic matter, Cations, Photochemical reactions, Surface chemistry, Reaction kinetics, Environmental

transport, Land pollution, Water pollution, Molecular weight, pH, *Fluorescence quenching.

PB94-158862/REB PC A04/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Environmental Monitoring and Assessment Program.
Environmental Monitoring and Assessment Program Assessment Framework.
FTN Associates, Little Rock, AR.
K. W. Thornton, G. E. Saul, and D. E. Hyatt. Feb 94, 53p EPA/620/R-94/016
Contract EPA-68-DO-0093
See also PB94-114915. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Environmental Monitoring and Assessment Program.

The document presents a framework for conducting assessments in the Environmental Monitoring and Assessment Program (EMAP). The framework describes basic elements of the assessment process and provides a common foundation for conducting assessments within EMAP. Because of its general nature, the framework should be adaptable to a diverse set of assessment questions and needs. Consequently, the document is written to assist science administrators and resource managers in understanding the EMAP assessment process.

Keywords: *Risk assessment, *Environment management, *Ecology, Natural resources management, Biological indicators, Environmental policy, Man environment interactions, Environmental effects, Environment pollution, Land use, Planning, Decision making, Guidelines, EMAP(Environmental Monitoring and Assessment Program).

PB94-158938/REB PC A21/MF A04
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Proceedings: Symposium on the Transfer and Utilization of Particulate Control Technology (8th). Volume 1. Electrostatic Precipitators. Held in San Diego, California on March 20-23, 1990. Rept. for Mar-Nov 90.
Electric Power Research Inst., Palo Alto, CA. Generation and Storage Div.
G. H. Ramsey. c1990, 490p EPRI-GS-7050-V1, EPA/600/R-94/049A
See also Volume 2, PB94-158946. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The two-volume proceedings describe the latest research and development efforts to improve particulate control devices, while treating traditional concerns of operational cost and compliance. Overall, particulate control remains a key issue in the cost and applicability of furnace sorbent injection, spray dryers, fluidized-bed combustion, municipal solid waste, and advanced power generation processes. EPRI and EPA cosponsored the symposium, in San Diego, CA, March 20-23, 1990, featuring more than 80 presentations. Participants included approximately 350 representatives of utilities, manufacturers, universities, architect/engineering firms, and research organizations. Two parallel sessions emphasized fabric filter and electrostatic precipitator (ESP) research. Several sessions addressed high-temperature filtration as well as the impact of new sulfur dioxide control processes on baghouses and ESPs. Volume 1 contains sessions on Precipitator controls, innovative pollution control technologies, precipitator modeling, fly ash/ESP studies, ESP plate spacing, ESP rapping, ESP performance upgrading and hot-side precipitator studies.

Keywords: *Meetings, *Air pollution control equipment, *Particulates, *Electrostatic precipitators, Performance evaluation, Mathematical models, Research and development, Operating costs, Compliance, Fabric filters, Technology innovation, Municipal wastes, Spray drying, Baghouses, Electric power generation, Sulfur dioxide, Injection, Fluidized-bed combustion.

PB94-158946/REB PC E99/MF A06
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Proceedings: Symposium on the Transfer and Utilization of Particulate Control Technology (8th). Volume 2. Baghouses and Particulate Control for New Applications. Held in San Diego, California on March 20-23, 1990. Rept. for Mar-Nov 90.
Electric Power Research Inst., Palo Alto, CA. Generation and Storage Div.
G. H. Ramsey. c1990, 649p EPRI-GS-7050-V2, EPA/600/R-94/049B
See also Volume 1, PB94-158938. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The two-volume proceedings describe the latest research and development efforts to improve particulate control devices, while treating traditional concerns of operational cost and compliance. Overall, particulate control remains a key issue in the cost and applicability of furnace sorbent injection, spray dryers, fluidized-bed combustion, municipal solid waste, and advanced power generation processes. EPRI and EPA cosponsored the symposium, in San Diego, CA, March 20-23, 1990, featuring more than 80 presentations. Participants included approximately 350 representatives of utilities, manufacturers, universities, architect/engineering firms, and research organizations. Two parallel sessions emphasized fabric filter and electrostatic precipitator (ESP) research. Several sessions addressed high-temperature filtration as well as the impact of new sulfur dioxide control processes on baghouses and ESPs. Volume 2 contains sessions on low ration baghouse O&M experience, pulse-jet baghouse experience, particulate control for AFBCs, particulate control for dry SO2 control processes, baghouse design and performance studies, fundamental baghouse studies, high temperature filtration, and control of emissions from RDF incinerators. Both fabric filters and ESPs are discussed in the AFBC and dry SO2 control papers.

Keywords: *Meetings, *Air pollution control equipment, *Particulates, *Baghouses, Fluidized-bed combustors, Fabric filters, Operation and maintenance, Spray drying, Research and development, Electric power generation, Circulating systems, Refuse derived fuels, Design criteria, Performance evaluation, Sulfur dioxide.

PB94-159019/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Critical Evaluation of the Diffusion Hypothesis in the Theory of Porous Media Volatile Organic Compound (VOC) Sources and Sinks. Journal article.
Arkansas Univ., Fayetteville. Dept. of Mathematical Sciences.
J. E. Dunn, and T. Chen. c1993, 18p EPA/600/J-94/118
Pub. in Modeling of Indoor Air Quality and Exposure, ASTM STP 1205, p64-80 Sep 93. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper proposes three alternative, diffusion-limited mathematical models to account for this interaction, using the linear isotherm model as a reference point. Their taxonomy is keyed to the nature of the vapor-sink interface. While the linear isotherm model gave an adequate description of data when a pillow-sink was challenged with ethylbenzene, a new single-parameter diffusion model gave a much improved description of data when the same pillow-sink was challenged with perchloroethylene. A hybrid, sorption/desorption, diffusion-limited model was the only plausible model when a carpet-sink was challenged with ethylbenzene. Some new computational aids, particularly interval-weighted least squares, are introduced in the context of model validation. (Copyright (c) American Society for Testing and Materials 1993.)

Keywords: *Indoor air pollution, *Diffusion, *Porous materials, Reprint, Mathematical models, Isotherms, Stationary sources, Organic compounds, Least squares method, Carpets, Ethyl benzene, Emission, Statistical analysis, Environmental exposure, *VOCs(Volatile organic compounds), *Perchloroethylene.

PB94-159027/REB PC A03/MF A01
Field Comparison of Portable Gas Chromatographs with Method TO-14.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
R. E. Berkley, M. Colon, J. Gonzalez, I. Droz, and J. Adams. 1993, 18p EPA/600/A-94/045
Prepared in cooperation with Puerto Rico Univ., San Juan. School of Public Health., ManTech Environmental Technology, Inc., Research Triangle Park, NC., CMS Research Corp., Birmingham, AL., and HNU Systems, Inc., Newton, MA.

A field-deployable prototype fast gas chromatograph (FGC) and two commercially-available portable gas chromatographs (PGC) were evaluated by measuring organic vapors in ambient air at a field monitoring site in metropolitan San Juan, Puerto Rico. The data were compared with simultaneous grab samples which were collected in six-liter Summa-polished canisters and analyzed by method TO-14. Because of fluctuating retention times, the FGC produced no useable data. High humidity levels may have adversely affected its performance. Both commercially-available PGCs performed successfully, and data from twenty analyses were compared with the reference method.

Keywords: *Gas chromatographs, *Air pollution monitoring, *Portable equipment, Field tests, Air pollution sampling, Vapors, Organic compounds, Performance evaluation, *FGC(Fast gas chromatograph), *PGC(Portable gas chromatograph), San Juan(Puerto Rico).

PB94-159043/REB PC A09/MF A02
Environmental Protection Agency, Dallas, TX. Region VI.
Trawling Bycatch in the Galveston Bay System. Final rept.
Galveston Bay National Estuary Program,, Austin, TX.
E. X. Martinez, J. M. Nance, Z. P. Zein-Eldin, J. Davis, and L. Rathmell. Aug 93, 192p GBNEP-34
Grant EPA-CE-006550-01
See also PB94-139433. Prepared in cooperation with National Marine Fisheries Service, Galveston, TX. Galveston Lab. Sponsored by Environmental Protection Agency, Dallas, TX. Region VI.

The Galveston Bay National Estuary Program commissioned an investigation to characterize shrimp trawl bycatch in the Galveston Bay System. The characterization study, performed by the National Marine Fisheries Service (NMFS) Galveston Laboratory, was conducted in three phases: (1) a review of historical bycatch studies, (2) initiation of new data collection efforts on commercial vessels, and (3) a comparison of new data collected with fishery independent surveys of the Texas Parks and Wildlife Department (TPWD). Three historical studies regarding bycatch in Galveston Bay were identified and reviewed.

Keywords: *Shrimps, *Fishing, *Galveston Bay, Surveys, History, Fishing grounds, Hydrology, Salinity, Biomass, Flatfishes, Trout, Crabs, Species diversity, Design criteria, Graphs(Charts), Maps, Ocean temperature, *Trawling, Catch statistics, Atlantic croker, Menhaden fish, Fishing vessels.

PB94-159050/REB PC A07/MF A02
Environmental Protection Agency, Dallas, TX. Region VI.
Probable Causes of Trends in Selected Living Resources in the Galveston Bay System. Final rept.
Galveston Bay National Estuary Program,, Austin, TX.
A. H. Walton, and A. W. Green. Aug 93, 150p GBNEP-33
Grant EPA-CE-006550-01
Prepared in cooperation with Texas Parks and Wildlife Dept., Austin. Sponsored by Environmental Protection Agency, Dallas, TX. Region VI.

The report is part of the effort to characterize the ecosystem of the Galveston Estuary. Its purpose is to investigate the probable causes of trends in the abundance of certain species, especially recent declines, as they relate to the overall health of the ecosystem. For some species, confining the discussion to a geographic scale as small as a single estuary may give a false impression of its population. But the primary question here is that of the health of the estuarine system, not the health of a particular species. The species emphasized are those determined in an earlier study with an emphasis on ecologically and commercially important organisms: finfish and shellfish, locally breeding birds, alligators, plankton, and open bay and marsh benthos. Statistically significant declining trends were most conspicious for white shrimp, blue crab, and certain species of colonial waterbirds.

Keywords: *Natural resources, *Aquatic ecosystems, *Galveston Bay, *Estuaries, *Water pollution effects, Trends, Species diversity, Abundance, Populations, Shellfish, Birds, Plankton, Alligator weed, Benthos, Marshes, Crabs, Coasts, *National Estuary Program, Finfish, Alligators, Waterbirds.

PB94-159092/REB PC A12/MF A03
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Annual RREL Research Symposium (20th) Abstract Proceedings. Held in Cincinnati, Ohio on March 15-17, 1994.
Science Applications International Corp., Fort Washington, PA.
Mar 94, 255p EPA/600/R-94/011
Contract EPA-68-C2-0148
See also PB92-166859. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The Twentieth Annual Risk Reduction Engineering Laboratory (RREL) Research Symposium was held in Cincinnati, Ohio, March 15-17, 1994. The purpose of this Symposium was to present the latest significant research findings from ongoing and recently completed projects funded by the Risk Reduction Engineering Laboratory. These Proceedings are organized into two sections. Part One contains extended abstracts of the paper presentations. Part Two contains abstracts of the poster displays. Subjects include pollution prevention demonstrations and life cycle analysis; remediation technologies from the SITE Program, RREL technologies, and oil spills remediation technologies; drinking water and wastewater technologies; municipal solid waste technologies; and hazardous waste technologies.

Keywords: *Hazardous materials, *Waste management, *Meetings, Land pollution control, Water pollution control, Water treatment, Air pollution control, Superfund, Soil contamination, Landfills, Liners, Remediation, Industrial wastes, Waste water, Technology utilization, Research projects, Waste minimization, Physical treatment.

PB94-159100/REB PC A14/MF A03
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Technical Guidance Document: Quality Assurance and Quality Control for Waste Containment Facilities.
Texas Univ. at Austin. Dept. of Civil Engineering.
D. E. Daniel, and R. M. Koerner. Sep 93, 325p EPA/600/R-93/182
Prepared in cooperation with Drexel Univ., Philadelphia, PA. Geosynthetic Research Inst. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

This Technical Guidance Document provides comprehensive guidance on procedures for quality assurance and quality control for waste containment facilities. The document includes a discussion of principles and concepts, compacted soil liners, soil drainage systems, geosynthetic drainage systems, vertical cutoff walls, ancillary materials, appurtenances, and other details. The guidance document outlines critical Quality Assurance (QA) and Quality Control (QC) issues for each major segment and recommends specific procedures, observations, tests, corrective actions, and record keeping requirements. For geosynthetics, QA and QC practices for both manufacturing and construction are suggested. The main body of the text details recommended procedures for quality assurance and control. Appendices include a list of acronyms, glossary, and index.

Keywords: *Waste disposal, *Containment systems, *Waste storage, Barriers, Liners, Construction materials, Geotechnical fabrics, Retaining walls, Reinforcement(Structure), Soil mechanics, Drainage, Leaching, Standards, Design criteria, Inspection, Quality assurance, Performance evaluation, Geomembranes.

PB94-159118/REB PC A08/MF A02
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Innovative Clean Technologies Case Studies.
Center for Hazardous Materials Research, Pittsburgh, PA.
K. R. Stone. Aug 93, 152p EPA/600/R-93/175
Grant EPA-R-817670
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The case studies contained herein are the products of the 'Pollution Prevention by and for Small Business' Program (P2SB). The P2SB was an outreach program directed to small businesses that had developed innovative concepts for pollution prevention in their industries. The P2SB focused on high-risk concepts without ephasis on media or industry in order to provide an open program where ground-breaking concepts were given a fair opportunity. The P2SB provided awards of up to $25,000 to assist small businesses for conducting their own demonstrations of pollution prevention techniques and technologies, and for advancing their products towards a practical stage.

Keywords: *Small businesses, *Pollution prevention, Lubricants, Case studies, Technology innovation, Industries, Waste recycling, Pallets, Adhesives, Electric conductors, Ink, Membranes.

PB94-159126/REB PC A12/MF A03
Fish Physiology, Toxicology, and Water Quality Management. Proceedings of an International Symposium. Held in Sacramento, California, on September 18-20, 1990.
Environmental Research Lab., Athens, GA. Office of Research and Development.
R. C. Russo, and R. V. Thurston. Aug 93, 251p EPA/600/R-93/157
See also PB90-192998. Prepared in cooperation with Montana State Univ., Bozeman. Fisheries Bioassay Lab.

Scientists from five countries presented papers at the Second International Symposium on Fish Physiology, Toxicology, and Water Quality Management, which was held in Sacramento, California, on September 18-20, 1990. The proceedings includes 21 papers presented in sessions on the physiological effects of pollutants on fish, the uptake and depuration of toxicants by fish, and water quality management. Papers address the reproduction and growth of fishes, respiratory physiology, bioaccumulation of toxicants, microcosms, ecotoxicology, surface water quality including mine drainage, metal complexation and xenobiotics, and water quality models and management strategies.

Keywords: *Toxicology, *Animal physiology, *Fisheries, *Meetings, *Water quality management, Water resources, Environmental monitoring, Water pollution effects(Animals), Growth, Yangtze River, Water temperature, Respiration, Zinc, Biological accumulation, Insecticides, Oxygen, Metals, Detoxification, Mine acid drainage, Water quality models.

PB94-159134/REB PC A19/MF A04
North American Landscape Characterization (NALC). Pathfinder Project Research Plan. Global Change Research Program.
Environmental Monitoring Systems Lab., Las Vegas, NV.
R. S. Lunetta, J. G. Lyon, J. A. Sturdevant, J. L. Dwyer, and C. D. Elvidge. Jul 93, 431p EPA/600/R-93/135
Prepared in cooperation with Ohio State Univ., Columbus. Dept. of Civil Engineering., EROS Data Center, Sioux Falls, SD., Nevada Univ. System, Las Vegas. Desert Research Inst., and Lockheed Environmental Systems and Technologies Co., Las Vegas, NV.

The project is a component of the National Aeronautics and Space Administration (NASA) Landsat Pathfinder program of experiments to study global change issues. The purpose of the project is to produce land cover and land cover change data products at sub-kilometer spatial resolution across major portions of the North American continent (Central America, Mexico, Caribbean and Hawaiian Islands, and the United States). The NALC - Pathfinder is designed to provide primary data for national inventories of terrestrial carbon stocks and trace greenhouse gases (CO, CH4, and N2O) emissions in support of the Intergovernmental Panel on Climate Change (IPCC) objectives. The objectives of the NALC project are to produce standardized remote sensing data sets, develop standardized analyses methods, and derive standardized land cover change products for priority locations in the North American continent.

Keywords: *Environmental monitoring, *Remote sensing, *Information management, Greenhouse effect, Landsat satellites, Change detection, Global air pollution, Image analysis, Data acquisition, Standardization, Data bases, Inventories, US EPA, US GS, NASA, Central America, Mexico, Hawaii, United States, *Landsat MSS, *NALC, *GWRP(Global Warming Research Program), *IPCC(Intergovernmental Panel on Climate Change), Caribbean.

PB94-159142/REB PC A14/MF A03
Manual: Nitrogen Control.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
O. K. Scheible, M. Mulbarger, P. Sutton, T. Simpkin, and G. Daigger. Sep 93, 325p EPA/625/R-93/010
See also PB-259 149.

The manual is an update and revision of the original 1975 edition. Given the experience of the past 18 years, the focus of this edition is directed to those biological/mechanical systems that have found widespread use for nitrification and nitrogen removal. The primary audience is the designer of small to medium sized facilities, although the application of the manual is not limited to any range of plant sizes. The manual focuses on the major process and design aspects considered in the development of an effective design. The manual is organized to help the designer in the planning stages of a facility, highlighting important process and operation and maintenance considerations.

Keywords: *Water pollution control, *Nitrogen, *Manuals, Water treatment, Nitrification, Denitrification, Chlorination, Waste water, Chemical removal(Sewage treatment), Bioreactors, Biological treatment, Sludge, Chemical reactions, Mathematical models, Design criteria, Physical processes.

PB94-159233/REB PC A03/MF A01
Ecological Risk Assessment: Protecting Northwest Anadromous Salmonid Stocks. Symposium paper.
Corvallis Environmental Research Lab., OR.
R. T. Lackey. 1994, 35p EPA/600/A-94/046
See also PB93-102192 and PB94-105343. Presented at Pacific Salmon and Their Ecosystems: Status and Future Options Symposium, Seattle, WA., January 10-12, 1994.

Ecological risk assessment is usually defined as the process that evaluates the likelihood that adverse ecological effects are occurring, or may occur, as a result of exposure to one or more stressors. The basic concept, while straightforward, is difficult to apply. Applications of risk assessment to the Pacific Northwest salmonid problem would be difficult politically, but could be accomplished technically. Defining what is at risk is the first and most difficult step, and must be resolved within the political decision-making framework or the results of the risk assessment will be of limited utility. A major benefit of the risk assessment process might be to force analysis of what is really imporatnt to the public, rather than what is important to scientists and natural resources managers.

Keywords: *Risk assessment, *Ecology, *Salmon, *Meetings, Water pollution, Environmental impacts, Protection, Exposure, Fishes, Aquatic ecosystems, Decision making, Quality control, Pacific Ocean, Northwest Region(United States).

PB94-159241/REB PC A03/MF A01
Global Ecosystems Database Project: An Experiment in Data Integration for Global Change. Symposium paper.
Corvallis Environmental Research Lab., OR.
J. J. Kineman, D. L. Phillips, and M. A. Ohrenschall.
1993, 13p EPA/600/A-94/047
See also PB94-141520 and PB94-141538. Presented at the International Conference/Workshop on Integrating GIS and Environmental Modeling, (2nd), Breckenridge, CO., September 26-30, 1993. Prepared in cooperation with National Geophysical Data Center, Boulder, CO. and Cooperative Inst. for Research in Environmental Science, Boulder, CO.

The Global Ecosystems Database Project (GEDP) is developing an integrated global database to support global change characterization and modeling. One CD-ROM of integrated data was published in 1992 (NOAA -EPA, 1992) with supporting documents, and another is in development. The paper describes current data integration work and discusses future directions. The current integration effort adds regional data-

bases and model outputs along with additional global data. A research effort is planned to evaluate effectiveness of the approach in supporting modeling and research.

Keywords: *Climatic change, *Environmental monitoring, *Information systems, Reprint, Climate models, Ecosystems, Air-biosphere interactions, Global aspects, Thematic mapping, Modeling, Research programs, Data processing, Data base management, Global Ecosystems Database Project.

PB94-159258/REB PC A01/MF A01
Effects of CO2 on Competition between Rice and Barnyardgrass. Symposium paper.
Corvallis Environmental Research Lab., OR.
D. M. Olszyk, and L. L. Ranasinghe. 1994, 5p EPA/600/A-94/048
Pub. in Proceedings of International Symposium on Climate Change and Rice, Los Banos, Philippines, Mar 94. Prepared in cooperation with Oregon State Univ., Corvallis.

The atmospheric CO2 concentration is increasing. Effects of elevated CO2 on rice production could occur not only through direct impacts to rice, but also indirectly via ecosystem responses. Changed competitiveness with elevated CO2 could occur between rice which has the C3 type of photosynthesis vs. barnyardgrass (a serious weed in rice fields) which exhibits C4 photosynthesis, as has been resported for other plants. Thus, preliminary experiments were conducted to test the hypothesis that the C3 crop rice and the C4 weed barnyardgrass respond differently to CO2, affecting competition between them when grown at different relative densities in the same container.

Keywords: *Carbon dioxide, *Rice plants, *Production, *Air pollution effects, Ecosystems, Photosynthesis, Weeds, Experimental design, Tests, Response, Competition, Density(Mass/volume), Reprint, *Barnyardgrass.

PB94-159266/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Solvent Washing of Aged PCP Contaminated Soils.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
A. P. Khodadoust, J. A. Wagner, M. T. Suidan, and S. I. Safferman. c1993, 11p EPA/600/A-94/049
See also PB92-180025. Pub. in Proceedings of the Annual Conference and Exposition (66th), Water Environment Federation, Anaheim, CA., October 3-7, 1993, p213-222. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The study evaluates the removal of pentachlorophenol (PCP), a wood preserving agent, from soils that have been contaminated over a period of time. Previously, equal proportions of ethanol and water were found to have the highest PCP removal efficiencies for above ground batch extractions at various soil:solvent ratios. In addition, the 50% and 75% ethanol solutions achieved higher removal efficiencies at low solvent throughputs in in-situ soil flushing experiments. In batch extraction tests, the 50% ethanol solution obtained higher PCP removal efficiencies for all soil fractions than the DI water and 100% ethanol solution. The PCP removal efficiency for in-situ above ground soil washing experiments was consistently higher for the 100x140 U.S. mesh soil, regardless of the aging period. In addition, for both in-situ flushing and above ground tests, a lower PCP removal efficiency was obtained for the 20x40 U.S. mesh soil conditioned at 60 C than that for the same soil fraction aged at room temperature. (Copyright (c) 1993 Water Environment Federation).

Keywords: *Soil treatment, *Contaminants, *Solvents, *Wood preservatives, Removal, Effectiveness, In-situ processing, Ethanol, Solvent extraction, Water pollution control, Reprint, *Soil washing, Pentachlorophenol, Phenol/pentachloro, Soil flushing.

PB94-159274/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Treatment of PCP Containing Wastewater Using Anaerobic Fluidized Bed GAC Bioreactors.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
J. Wagner. c1993, 14p EPA/600/A-94/050
Pub. in Proceedings of the Annual Conference and Exposition (66th), Water Environment Federation, Anaheim, CA., October 3-7, 1993, p189-200. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The study evaluates the use of two anaerobic fluidized-bed granular activated carbon (GAC) bioreactors for treating pentachlorophenol (PCP), one of the major toxic compounds found in wastewaters stemming primarily from wood preserving industries. The reactors are fed synthetic solutions of PCP in 95% ethanol, where ethanol is the primary substrate and PCP the cometabolite. A carbonate buffer and another solution containing growth nutrients and vitamins are also fed to the bioreactors. COD balances show that most of the effluent COD occurs in the effluent gas, containing 87-94% methane, indicating sustained anaerobic activity in the bioreactors. In addition, analysis of effluent PCP< mono-, di-, and trichlorophenols indicate that PCP is dechlorinated in the reactor to an equivalent molar concentration of 3- and 4-chlorophenol. (Copyright (c) 1993 Water Environment Federation.)

Keywords: *Activated carbon, *Anaerobic processes, *Municipalities, *Fluidized bed processing, *Industrial waste treatment, *Wood preservatives, Reprint, Bioreactors, Ethanols, Substrates, Concentration(Composition), Toxicity, Carbon dioxide, Degradation, Performance evaluation, Methane, Pentachlorophenol, Monochlorophenol, Granulated activated carbon, Phenol/Trichloro.

PB94-159282/REB PC A03/MF A01
Methanogenesis and Sulfate Reduction in Chemostats: A Fundamental Experimental Kinetic Study and Modeling. Rept. for 1992-93.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
A. Gupta, J. R. V. Flora, M. Gupta, G. D. Sayles, and M. T. Suidan. c1993, 15p EPA/600/A-94/051
Pub. in Proceedings of the Annual Conference and Exposition (66th), Water Environment Federation, Anaheim, CA., October 3-7, 1993, p193-204. Prepared in cooperation with Weston (Roy F.), Inc., Philadelphia, PA. and Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.

Six chemostats containing mixed anaerobic cultures were used to investigate interactions between sulfate reduction and methanogenesis for three substrates: acetic acid, methanol, and formic acid. Sulfate reducers outcompeted methanogens for acetic acid while methanol was not utilized by sulfate reducers. For the chemostat with formic acid feed, competition was observed between methanogens and sulfate reducers with 62% and 24% of the substrate utilized by sulfate reduction and methanogenesis, respectively. A comprehensive dynamic model was developed that simulates methanogenesis and sulfate reduction in a chemostat. The model incorporates the complex chemistry of anaerobic systems and was able to predict both the steady state and the batch tests reasonably well. (Copyright (c) 1993 Water Environment Federation.)

Keywords: *Sulfur bacteria, *Water pollution control, *Biodegradation, *Meetings, Anaerobic processes, Mathematical models, Reaction kinetics, Formic acid, Methanol, Acetic acid, Biochemistry, Bioreactors, Stoichiometry, Material balance, Reprint, *Chemostat, *Methanogenesis, *Sulfate toxicity.

PB94-159290/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Modeling Chemical Interactions in Anaerobic Biofilm Systems. Rept. for 1992-93.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
J. R. V. Flora, M. T. Suidan, P. Biswas, and G. D. Sayles. c1993, 14p EPA/600/A-94/052
Pub in Proceedings of the Annual Conference and Exposition (66th), Water Environment Federation, Anaheim, CA., October 3-7, 1993, p307-317. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Rigorous steady-state models of acetate- and methanol-utilizing methanogenic biofilms are developed taking into account the mass transfer of neutral and ionic species, pH changes within the biofilm, pH-dependent Monod kinetics, chemical equilibrium, electroneutrality, gas production within the biofilm, and the presence of a concentration boundary layer (CBL). The study shows that significant differences can exist between the flux predictions using the traditional models and when pH changes within the biofilm are taken into account. The biofilm models are coupled to a model of a completely-stirred tank reactor (CSTR) and strategies for the optimization of biofilm reactor performance are examined. (Copyright (c) 1993 Water Environment Federation.)

Keywords: *Anaerobic processes, *Mathematical models, *Bioreactors, Reprint, pH, Methanol, Acetate, Reaction kinetics, Mass transfer, Thin films, Waste water treatment, Organic compounds, Diffusion coefficient, Flux(Rate), Concentration(Composition), *Biofilm, *CSTR(Completely-stirred tank reactor), Electroneutrality.

PB94-159308/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Developing a Kinetic Leaching Model for Solidified/Stabilized Hazardous Wastes.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
K. Y. Cheng, and P. L. Bishop. 1994, 19p EPA/600/A-94/053
Contract EPA-68-03-3379
See also PB90-179656. Presented at Symposiums on Solidification/Stabilization: Mechanisms and Applications, Lemar, TX., February 15-16, 1990. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Chemical stabilization/solidification is common practice in the disposal of radioactive waste. In recent years this method has been applied to treatment of hazardous materials. The potential impact on the environment of solid wastes disposed on land is most frequently assessed and predicted using bench scale laboratory leaching tests. In order to do this effectively, predictive mathematical models must be used. The paper shows the relationship of the hydrogen ion in the leachant, the distance of leaching front, and the alkalinity leached from the solid matrix. Using these results, kinetic leaching models are developed.

Keywords: *Hazardous materials, *Leaching, *Mathematical models, Reprint, Chemical reactions, Penetration, Permeability, Binders, Compressive strength, Cements, Waste treatment, Solidification, Stabilization, Metals, Solid waste disposal.

PB94-159316/REB PC A03/MF A01
Treatment of Volatile Organic Compounds in Waste Gases Using a Trickling Biofilter System: A Modeling Approach. Proceedings 1992-93.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
P. J. Smith, P. Biswas, M. T. Suidan, and R. C. Brenner. 1993, 19p EPA/600/A-94/054
Pub. in Proceedings of the Annual Meeting and Exhibition of Air and Waste Management Association (86th), Denver, CO., June 13-18, 1993, p2-16. See also PB93-179232. Prepared in cooperation with Cincinnati Univ., OH.

Biofiltration represents a novel strategy for controlling VOC emissions from a variety of industrial processes. A modeling approach for a trickle bed biofilter was developed in this work that incorporates several accepted idealizations about biofilm systems. The biofilter model proposed quantifies the treatment of a single component VOC waste stream in a system operating at steady state. Affects of biological growth on the hydrodynamics of the flow are accounted for, and the full Monod kinetic rate expression is used in describing VOC consumption in the biofilms. A relationship between the flux into a biofilm and the corresponding thickness is also incorporated into the model. This leads to a prediction of a biofilm profile through the bed depth with thicker films at the inlet of the filter where concentrations are higher.

Keywords: *Air pollution control, *Mathematical models, *Trickling filters, Reprint, Waste gases, Organic compounds, Industrial wastes, Kinetics, Steady state, Film thickness, Filtration, *VOCs(Volatile organic compounds), Trickle bed biofilter.

PB94-159324/REB PC **A03/MF A01**
Development of Aerobic Biofilter Design Criteria for Treating VOCs. Proceedings 1992-93.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
G. A. Sorial, F. L. Smith, P. J. Smith, M. T. Suldan, and P. Biswas. 1993, 21p EPA/600/A-94/055
Pub. in Proceedings of the Annual Meeting amd Exhibition of Air and Waste Management Association (86th), Denver, CO., June 13-18, 1993, p2-16. Prepared in cooperation with Cincinnati Univ., OH.

The paper reports preliminary results on the use of trickle bed biofilters with monolithic ceramic channelized microbial support structures for the treatment of VOCs typical of landfill leachate stripping. Toluene was used for the purpose of characterizing the trickle bed biofilter apparatus. The objectives of the experiment were to investigate the performance of such biofilters, with both cocurrent and countercurrent gas VOC and liquid nutrient/buffer flows, at inlet toluene concentrations that are high, relative to most biofilter research to date.

Keywords: *Air pollution control, *Trickling filters, *Toluene, Organic compounds, Industrial waste treatment, Earth fills, Leaching, Stripping(Distillation), Gas flow, Aerobic processes, Reprint, *VOCs(Volatile organic compounds), *Trickle bed biofilter, Ceramic monolithic channelized media.

PB94-159332/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Climate Warming and the Carbon Cycle in the Permafrost Zone of the Former Soviet Union. Journal article.
Oregon State Univ., Corvallis. Dept. of Civil Engineering.
T. P. Kolchugina, and T. S. Vinson. c1993, 17p EPA/600/J-94/129
Pub. in Permafrost and Periglacial Processes, v4 p149-163 1993. See also PB93-191484. Sponsored by Corvallis Environmental Research Lab., OR.

The continuous permafrost zone of the former Soviet Union occupies 5% of the land surface area of the earth and stores a significant amount of carbon. Climate warming could disrupt the balance between carbon (C) accumulation and decomposition processes within the permafrost zone. Increased temperatures may accelerate the rate of organic matter decomposition. At the same time, the productivity of vegetation may increase in response to warming. To assess the future carbon cycle within the permafrost zone under a climate-warming scenario, it is necessary to quantify present carbon pools and fluxes. The present carbon cycle was assessed on the basis of an ecosystem/ecoregion approach. Under the present climate, the phytomass carbon pool was estimated at 17.0 Giga tons. The mortmass (coarse woody debris) carbon pool was estimated at 16.1 Giga tons. The soil carbon pool, including peatlands, was 139.4 Giga tons. The present rate of carbon turnover was 1.6 Giga tons/yr. (Copyright (c) 1993 by John Wiley and Sons, Ltd.)

Keywords: *USSR, *Carbon cycle, *Permafrost, *Forestry, Climatic changes, Global warming, Organic materials, Decomposition, Biomass, Soils, Tundra, Ecosystems, Primary biological productivity, Reprint, Carbon pools, Phytomass, Mortmass.

PB94-159340/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Conceptual Approaches for Incorporating Climatic Change into the Development of Forest Management Options for Sequestering Carbon. Journal article.
ManTech Environmental Technology, Inc., Corvallis, OR.
G. A. King. c1993, 19p EPA/600/J-94/130
Pub. in Climate Research, v3 p61-78 1993. See also DE83004172 and PB90-120072. Sponsored by Corvallis Environmental Research Lab., OR.

The potential for significant enviromental change over the next 100 years has resulted in efforts to develop mitigation options for reducing the rate of increase of carbon dioxide concentrations in the atmosphere. One of the more promising options is management of forest and agroforestry systems. However, most of the assessments of the potential of forest management options to sequester carbon have not factored in future environmental change (climate and CO2 concentration) into their analyses. Climate and ecological models that could be used to incorporate environmental change into forest mitigation planning efforts are reviewed in the paper in terms of their relative strengths and limitations for this particular application. Recommendations are then made as to how to use the available models to estimate the global and regional potential for sequestering carbon in the terrestrial biosphere, incorporating future environmental change into the analyses. Recommendations are also made as to how to target the most promising regions for reforestation efforts given the likelihood of future environmental change. (Copyright (c) Inter-Research 1993.)

Keywords: *Climatic changes, *Carbon dioxide, *Forest management, Reprint, Environmental surveys, Atmospheric composition, Concentration(Composition), Mitigation, Ecology, Mathematical models, Reforestation, Global warming, Regions.

PB94-159357/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Vegetation and Pollen Relationships in Eastern Canada. Journal article.
ManTech Environmental Technology, Inc., Corvallis, OR. Environmental Research Lab.
G. A. King. c18 Mar 92, 20p EPA/600/J-94/131
Contract EPA-68-C8-0006
Pub. in Canadian Jnl. of Botany v71 p193-210 1993. Also pub. as Minnesota Univ., Minneapolis. Limnological Research Center CONTRIB-453. Prepared in cooperation with Minnesota Univ., Minneapolis. Limnological Research Center. Sponsored by Corvallis Environmental Research Lab., OR.

The relationship between the vegetation and modern pollen assemblages in eastern Canada is summarized and analyzed using isopoll maps, ordination, and cluster analysis. The major vegetation zones recognized in the region are the shrub tundra, forest tundra (divided into shrub and forest subzones), lichen woodland, closed black-spruce forest, mixed boreal forest, and coastal barrens. The pollen assemblages of the major vegetation zones are distinguished primarily by differences in the relative abundance of a few important pollen types rather than floristic differences. Northern vegetation zones are characterized by relatively high Cyperaceae and low Picea pollen percentages, and southern zones by high Picea and Abies pollen percentages. Surface samples from each vegetation zone generally form distinctive groups in the ordination analysis. However, samples from the shrub subzone of the forest tundra cluster with shrub tundra samples, and lichen woodland samples cluster with samples from the closed black-spruce forest and the forest subzone of the forest tundra.

Keywords: *Vegetation, *Pollen, *Tundra, *Forests, Regions, Shrubs, Lichens, Differences, Sampling, Classifiying, Maps, Abundance, Cluster analysis, History, *Foreign technology, *Eastern Region(Canada), Translation, Black spruce trees, Cyperaceae, Picea, Abies.

PB94-159365/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Implications of Climate Change for the Water Balance of the Columbia River Basin, USA. Journal article.
ManTech Environmental Technology, Inc., Corvallis, OR.
D. Marks, G. A. King, and J. Dolph. c27 Jul 93, 13p EPA/600/J-94/132
Contract EPA-68-C8-0006
Pub. in Climate Research, v2 p203-213 1993. See also PB91-226522. Sponsored by Corvallis Environmental Research Lab., OR.

Here the authors summarize application of a spatially distributed water balance model that was tested using historical data from the U.S. portion of the Columbia River Basin in the Pacific Northwest for a very dry (1977) and very wet (1972) water year. The model adequately partitions incoming precipitation into evapotranspiration and runoff. Because precipitation in the basin is underestimated from measured data, modeled runoff is less than measured runoff from the basin during both the wet and dry years. The predicted future climate conditions significantly increase potential evapotranspiration, causing a 20% reduction in runoff relative to input precipitation, and a 58% reduction in soil moisture storage. If these changes in regional water balance are realized, the distribution and composition of forests in the Northwest would change markedly, and water resources would become more limited. (Copyright (c) Inter-Research 1993.)

Keywords: *Columbia River Basin, *Water balance, *Climatic change, Air-biosphere interactions, Runoff, Precipitation(Meteorology), Hydrology, Soil water, Evapotranspiration, Environmental impacts, Regional analysis, Mathematical models, Sensitivity analysis, Reprint, Pacific Northwest(United States).

PB94-159373/REB PC **A03/MF A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Experimental Study of Complete Dissolution of a Nonaqueous Phase Liquid in Saturated Porous Media. Journal article.
Princeton Univ., NJ. Dept. of Civil Engineering and Operations Research.
P. T. Imhoff, P. R. Jaffe, and G. F. Pinder. cFeb 94, 16p EPA/600/J-94/133
Grant EPA-R-814946
Pub. in Water Resources Research, v30 n2 p307-320 Feb 94. See also PB87-169090 and PB92-205640. Prepared in cooperation with North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering. and Vermont Univ., Burlington. Coll. of Engineering and Mathematics. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

The attenuation of gamma radiation was utilized to measure changing residual trichloroethylene (TCE) saturation in an otherwise water-saturated porous medium as clean water was flushed through the medium. A front over which dissolution actively occurred was observed. Gamma attenuation measurements and analyses of effluent water samples indicate that there was minimal if any transport of TCE as colloidal droplets. Even as trapped TCE ganglia decreased in size due to dissolution, there is no evidence that they became mobile and advected downgradient. Mass transfer rate coefficients were computed and are shown to be a function of Darcy flux, TCE volumetric contents, and distance into the region of residual TCE. (Copyright (c) 1994 American Geophysical Union).

Keywords: *Water pollution, *Porous materials, *Mathematical models, *Environmental transport, Mass transfer, Nonaqueous solvents, Subsurface flow, Dissolution, Solvent extraction, Gamma radiation, Ground water, Soil water, Saturation, Pore water, Tests, Porosity, Reprint, *TCE(Trichloroethylene), Ethnylene/trichloro, NAPLs(Nonaqueous phase liquids).

PB94-159381/REB PC **A03/MF A01**
Using Biopolymers to Remove Heavy Metals from Soil and Water. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
S. Krishnamurthy, and R. M. Frederick. c19 Nov 93, 12p EPA/600/J-94/134
Pub. in Remediation, v4 n2 p235-244, Spring 1994.

Chemical remediation of soil may involve the use of harsh chemicals that generate waste streams, which may adversely affect the soil's integrity and ability to support vegetation. This article reviews the potential use of benign reagents, such as biopolymers, to extract heavy metals. The biopolymers discussed are chitin and chitosan, modified starch, cellulose, and polymer-containing algae. (Copyright (c) Remediation 1994.)

Keywords: *Soil pollution, *Water pollution control, *Biotechnology, Heavy metals, Polymers, Chitins, Waste water treatment, Chelating agents, Starches, Algae, Chlorella, Cellulose, Oil spills, Sorption, Reprint, *Remediation, Starch xanthate, Chitosan, Biopolymers.

PB94-159399/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Leaching Boundary Movement in Solidified/Stabilized Waste Forms. Journal article.
Dames and Moore, Cincinnati, OH.
K. Y. Cheng, and P. L. Bishop. c1992, 7p EPA/600/J-94/135
Pub. in Jnl. of Air Waste Management Association, v42 p164-168 1992. Prepared in cooperation with Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering. Sponsored by Environmental Protection

Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Investigation of the leaching of cement-based waste forms in acetic acid solutions found that acids attacked the waste form from the surface toward the center. A sharp leaching boundary was identified in every leached sample, using pH color indicators. The movement of the leaching boundary was found to be a single diffusion-controlled process. (Copyright (c) 1992 Air & Waste Management Association.)

Keywords: *Waste forms, *Leaching, *Hazardous materials, Cements, Penetration, Permeability, Chemical reactions, Acetic acid, Durability, Structural analysis, Solidification, Stabilization, Reprint.

PB94-159407/REB PC **A02/MF A01**
Impact of Oxygen Mediated Oxidative Coupling on Adsorption Kinetics. Journal article 1990-93.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. D. Vidic, M. T. Suidan, and R. C. Brenner. c1994, 8p EPA/600/J-94/136
Pub. in Water Research, v28 n2 p263-268 1994. Prepared in cooperation with Cincinnati Univ., OH. and Pittsburgh Univ., PA.

The presence of molecular oxygen in the test environment promotes oxidative coupling (polymer formation) of phenolic compounds on the surface of granular activated carbon (GAC). Both adsorption equilibria and adsorption kinetics are affected by these chemical reactions. Lack of molecular oxygen interference with adsorption kinetics during the initial phase (first 12 h) of adsorbent-adsorbate contact, observed for the experimental conditions tested, can be explained by the lower rate of adsorbate polymerization when compared to the rate of pure adsorption. The homogeneous surface diffusion model (HSDM) adequately describes adsorption kinetics under anoxic conditions, but it fails to accurately predict experimental data collected in the presence of molecular oxygen. For the experimental conditions tested in the study, GAC particle size did not influence the magnitude of the surface diffusion coefficient. However, the increase in the initial adsorbate concentration yielded an increase in the surface diffusion coefficient. This may be attributed to a decrease in the adsorption forces for higher surface coverage.

Keywords: *Oxygenation, *Polymerization, *Phenols, *Adsorption, *Water pollution control, Reprint, Reaction kinetics, Surface chemistry, Diffusion, Activated carbon treatment, Granular activated carbon treatment.

PB94-159746/REB PC **A14/MF A03**
Environmental Protection Agency, Dallas, TX. Region VI.
Non-Fishing Human Induced Mortality of Fisheries Resources in Galveston Bay.
Galveston Bay National Estuary Program,, Austin, TX.
D. Palafox. May 93, 317p GBNEP-29
Grant EPA-CE-006550-01
Prepared in cooperation with Jones and Neuse, Inc., Austin, TX. Sponsored by Environmental Protection Agency, Dallas, TX. Region VI.

The purpose of the report was to evaluate and quantify the non-fishing human induced mortality on fisheries resources in Galveston Bay. The specific objectives of the study were: (1) to collect and summarize existing information regarding authorized water intake structures in Galveston Bay; (2) to collect and summarize existing information regarding impacts to estuarine species from other non-fishing human activities such as dredge and fill operations, seismic exploration, pipeline construction and removal, and oil and gas exploration/production activities; (3) to quantify the magnitude of mortality to species by major taxa, size ranges, seasons, and areas within the Galveston Bay system; and (4) to present any implications of mortality patterns as they affect fisheries population dynamics in Galveston Bay.

Keywords: *Marine fishes, *Fisheries, *Humans, *Mortality, *Galveston Bay, Intake systems, Dredging, Pipelines, Construction, Geophysical prospecting, Natural gas, Oils, Taxonomy.

PB94-159902/REB PC **A04/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Theoretical Evaluation of Stability of Volatile Organic Chemicals and Polar Volatile Organic Chemicals in Canisters.
Battelle, Columbus, OH.
R. W. Count. 22 Sep 93, 68p EPA/600/R-94/030
Contract EPA-68-D0-0007
See also AD-A192 435 and report for 1992, PB92-166941. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The potential for physical adsorption as a mechanism for loss of volatile organic chemicals (VOC) and polar volatile organic chemicals (PVOC) from the vapor phase in canister samples was assessed using the principles embodied in the Dubinin-Radushkevich isotherm. A computer-based model was developed for predicting adsorption behavior and vapor phase losses in multicomponent systems based on the potential for physical adsorption as well as the potential for dissolution in condensed water for samples collected at high humidities. At present, the data base for the model contains relevant physicochemical data for 78 compounds (including water), and provisions for inclusion of up to 120 additional compounds are incorporated in the software.

Keywords: *Air pollution sampling, *Organic compounds, *Adsorption isotherm, Cans, Mathematical models, Computer programs, Surface chemistry, Chemical reactions, Reaction kinetics, Data bases, Physicochemical properties, Chemisorption, Chemical stabilization, *VOCs(Volatile organic compounds), PVOCs(Polar volatile organic compounds).

PB94-159928/REB PC **A06/MF A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Evaluating ACQ as an Alternative Wood Preservative System.
Battelle, Columbus, OH.
A. S. C. Chen. Jan 94, 120p EPA/600/R-94/036
Contract EPA-68-C0-0003
See also PB94-114683. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The evaluation addresses the waste reduction/pollution prevention and economic issues involved in replacing chromated copper arsenate (CCA) with ammoniacal copper/quaternary ammonium (ACQ) as a way to preserve wood. The most obvious pollution prevention benefit gained by using ACQ is eliminating the use of arsenic and chromium, both of which generate hazardous wastes and a risk of contaminating the environment via chemical spills. Because most treatment plants are self-contained in that they reuse all wastewater produced within the plant and on the drip pads, no liquid waste problems were addressed for either the CCA or the ACQ treating process. The ACQ system generates more air pollution than does the CCA system, mainly as ammonia (NH3). For a plant with an annual production of 1 million cu ft (or about 20 million board feet), 90,000 lb of NH3 would be released per year from the ACQ treatment operations and the ACQ-treated wood. The treated wood, after being transferred from the drip pads to the outside storage yard, could become a major source of contamination.

Keywords: *Wood processing industry, *Hazardous materials, *Wood preservatives, *Pollution prevention, *Waste treatment, Waste minimization, Industrial plants, Environmental protection, Air pollution, Ammonia, Arsenic, Chromium, Waste water, Storm water runoff, Leaching, Tests, *Waste reduction, Pressure treatment, ACQ(Ammoniacal copper/quartemary ammonium).

PB94-160017/REB PC **A09/MF A03**
Reregistration Eligibility Decision (RED): Boric Acid and its Sodium Salts.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
16 Feb 94, 199p EPA/738/R-93/017
See also PB87-101903.

The Reregistration Eligibility Decision document (RED) addresses the eligibility for reregistration of pesticide products containing boric acid and its sodium salts; specifically it includes products containing boric acid, sodium tetraborate decahydrate (borax decahydrate), sodium tetraborate pentahydrate (borax pentahydrate), sodium tetraborate (anhydrous borax), disodium octaborate tetrahydrate, disodium octaborate (anhydrous), and sodium metaborate. The RED includes the reregistration case sodium metaborate which was initially grouped in a different registration standard but it is included here because this chemical is a sodium salt of boric acid. Originally, the RED was to have included boric oxide as an active ingredient. However, since there currently are no registered products with this active, boric oxide will not be included in the document.

Keywords: *Boric acid, *Pesticides, Toxicity, Exposure, Risk assessment, Humans, Animals, Public health, Regulations, Environmental effects, Chemical properties, Sodium compounds, *Sodium salts, *Reregistration, Use patterns.

PB94-160413/REB PC **A03/MF A01**
Improvements in Indirect Exposure Assessment Modeling: A Model for Estimating Air Concentrations and Deposition. Conference paper.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
D. B. Schwede, and J. S. Scire. 1994, 13p EPA/600/A-94/060
See also PB86-245248 and PB90-187055. Prepared in cooperation with Sigma Research Corp., Concord, MA. and National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div.

The paper describes the ISC-COMPDEP model and compares it with its predecessor, the COMPDEP model. COMPDEP was developed by the U.S. Environmental Protection Agency (EPA) to fulfill the need for a model to estimate concentrations and dry and wet deposition for receptors at all terrain heights for use in indirect exposure assessments. It was developed by combining the methodologies in the Industrial Source Complex (ISC) and COMPLEX I models with algorithms for modeling dry and wet deposition. A recent review of COMPDEP by the U.S. EPA identified several algorithms in the model as potential areas for improvement. The ISC-COMPDEP model was developed to address these weaknesses. Improvements were made in the following algorithms: dry deposition of particles, building wake effects, deposition in complex terrain, and modeling of area sources. A brief discussion of the major algorithms and a description of the sensitivity of concentration and deposition estimates to changes in the model algorithms are presented in the paper.

Keywords: *Air pollution, *Deposition, *Atmospheric models, *Combustion products, Mathematical models, Emission factors, Plumes, Pollution transport, Diffusion, Algorithms, Incinerators, *ISC-COMPDEP model.

PB94-160421/REB PC **A03/MF A01**
Implementation and Experimentation of an Advanced Land-Surface/PBL Model in the Penn State/NCAR Mesoscale Model (MM4). Conference paper.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
A. Xiu, and J. E. Pleim. 1993, 23p EPA/600/A-94/061
See also PB88-173232. Prepared in cooperation with MCNC, Research Triangle Park, NC. Information Technologies Div.

A more advanced land-surface/PBL model is implemented in the Penn State/NCAR Mesoscale Model Version 4(MM4) which is utilized to provide meteorological data to the Regional Acid Deposition Model (RADM). The diurnal evolution of the planetary boundary layer (PBL) and its dynamic characteristics are crucial to air quality modeling. The PBL is strongly dependent on surface fluxes of heat, moisture, and momentum. These fluxes are largely controlled by soil moisture and vegetative evapotranspiration. Previously, the MM4 was unable to respond to dynamic soil moisture conditions, leading to unrealistic partitioning of the surface energy budget between sensible and latent heat fluxes. The new model includes explicit soil moisture and evapotranspiration, as well as improved radiation and cloud cover algorithms, flux-profile relationships, and PBL mixing. The soil-vegetation-atmosphere transfer scheme is similar to the scheme devel-

oped for the French Weather Service mesoscale meteorological model. The PBL mixing scheme, a hybrid of eddy diffusion and nonlocal closure, is the same as is currently used in the RADM. The model has been previously tested in 1-D form against several field experiments and has demonstrated good agreement with measurements.

Keywords: *Atmospheric models, *Acid rain, *Meteorological data, Mathematical models, Evapotranspiration, Soil water, Flux rate, Cloud cover, Heat, Atmospheric temperature, Field tests, Kansas, Vegetation, Mesometeorology, *Land surface planetary boundary layer models, MM4 model.

PB94-160439/REB PC **A03/MF A01**
Solvent Washing of Aged PCP-Contaminated Soils. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
A. P. Khodadoust, J. A. Wagner, M. T. Suidan, and S. I. Safferman. c1993, 13p EPA/600/A-94/062
Pub. in Proceedings of the Annual Conference and Exposition (66th) of the Water Environment Federation, Anaheim, CA., October 3-7, 1993, p213-222. Prepared in cooperation with Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.

The study evaluates the removal of pentachlorophenol (PCP), a wood preserving agent, from soils that have been contaminated over a period of time. Previously, equal proportions of ethanol and water were found to have the highest PCP removal efficiencies for above ground batch extractions at various soil:solvent ratios. In addition, the 50% and 75% ethanol solutions achieved higher removal efficiencies at low solvent throughputs in in-situ soil flushing experiments.

Keywords: *Land pollution control, *Soil treatment, *Phenol/pentachloro, *Wood preservatives, *Waste treatment, *Liquid wastes, Soil contamination, In-situ processing, Herbicides, Ethanol, Organic solvents, Anaerobic processes, Granular activated carbon treatment, Reprint, *Soil washing.

PB94-160447/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Treatment of PCP Containing Wastewater Using Anaerobic Fluidized Bed GAC Bioreactors.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
J. A. Wagner, A. P. Khodadoust, M. T. Suidan, and S. I. Safferman. c1993, 15p EPA/600/A-94/063
Pub. in Proceedings of the Annual Conference and Exposition (66th) of the Water Environment Federation, Anaheim, CA., October 3-7, 1993, p189-200. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The study evaluates the use of two anaerobic fluidized-bed granular activated carbon (GAC) bioreactors for treating pentachlorophenol (PCP), one of the major toxic compounds found in wastewaters stemming primarily from wood preserving industries. The reactors are fed synthetic solutions of PCP in 95% ethanol, where ethanol is the primary substrate and PCP the cometabolite. A carbonate buffer and another solution containing growth nutrients and vitamins are also fed to the bioreactors. Both anaerobic bioreactors were operated under similar conditions during acclimation and initial loading of PCP. After stable performance was achieved, the operating conditions on the reactors were varied to study the effect of empty bed contact time (EBCT) under conditions of constant PCP loading rates with the optimum goal of minimizing the EBCT that permits for stable operation to occur.

Keywords: *Water pollution control, *Phenol/pentachloro, *Granular activated carbon treatment, *Fluidized beds, *Biological treatment, Reprint, Wood preservatives, Anaerobic processes, Herbicides, Design criteria, Performance evaluation, Bioreactors, Chemical oxygen demand, EBCT(Empty Bed Contact Time).

PB94-160454/REB PC **A03/MF A01**
Nature and Function of the Brown Cell in 'Crassostrea virginica'. Journal article.
Environmental Research Lab., Narragansett, RI.
G. Zaroogian, and P. Yevich. Jan 93, 15p EPA/600/J-94/159, ERLN-1189
Pub. in Marine Environmental Research 37, p355-373 1994.

The study was undertaken to determine the role of the brown cell in Crassostrea virginica in degradative and detoxification processes. Histopathological and biochemical methods were used to study brown cells in vivo and in vitro before and after treatment with organic and inorganic compounds. Histopathological examination indicated that brown cells in the connective tissue of healthy animals were sparse, and found primarily around sinusoids and in the intertubular connective tissue of the digestive diverticula. Brown cells in the auricle were derived from connective tissue of the auricular muscle bundles and occurred on the surface and within the muscle bundles. In addition, the surface of the pericardial wall was lined with brown cells. At sites of inflammation, and increase in the number and size of brown cells occurred as well as an increase in the number and color density of brown vesicles in the cytoplasm. (Copyright (c) 1994 Elsevier Science Limited, England.)

Keywords: *Oysters, Chemical water pollutants, Phagocytosis, Pathology, Dyes, Cell separation, Metals, Electron microscopy, Decontamination, In vivo analysis, In vitro analysis, Reprint, *Crassostrea virginica, *Brown cells.

PB94-160462/REB PC **A02/MF A01**
Comparative Toxicity of Chemicals to Earthworms. Journal article.
Corvallis Environmental Research Lab., OR.
C. A. Callahan, M. A. Shirazi, and E. F. Neuhauser. c1994, 10p EPA/600/J-94/161
Pub. in Environmental Toxicology and Chemistry, v13 n2 p291-298 1994. Prepared in cooperation with Niagara Mohawk Power Corp., Syracuse, NY.

The concentration-response (mortality) relationships of four species of earthworms, Eisentia fetida, Allolobophora tuberculata, Eudrilus eugeniae, and Perionyx excavatus are summarized for 62 chemicals and two test protocols. A Weibull function is used to summarize these data for each chemical in terms of sensitivity and toxicity, in addition to the LC50. The estimation of the Weibull parameters a and k summarize the entire concentration-response relationship. This technique should be applicable to a variety of testing protocols with different species whenever the goal is summarizing the shape of the concentration-response curves to fully evaluate chemical impact on organisms. In some cases for these data four orders of magnitude separate LC50s of the soil test and the contact test for the same chemical and species. All four species appear to be similar in range of toxicity and tolerance to these chemicals, suggesting that Eisenia fetida may be representative of these four species and these chemicals.

Keywords: *Toxicity, *Worms, *Chemical compounds, *Tests, Mortality, Species diversity, Response, Sensitivity, Phenols, Amines, Benzene, Hydrocarbons, Phythalates, Weibull density functions, Reprint, *Earthworms, Eisentia fetida, Allolobophora tuberculata, Eudrilus eugeniae, LC50, Metallic salts.

PB94-160470/REB PC **A02/MF A01**
Distribution of Relative Error of Toxicity of Herbicides and Metals to 'Arabidopsis'. Journal article.
Corvallis Environmental Research Lab., OR.
M. A. Shirazi, H. C. Ratsch, and B. E. Peniston. c1992, 9p EPA/600/J-94/160
Pub. in Environmental Toxicology and Chemistry, v11 p237-243 1992. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR.

The authors conducted toxicity tests with a group of chemicals that produce a wide range of response in Arabidopsis. They analyzed and integrated the test results in a form that is suitable for use in environmental research and management. Our emphasis was to broaden the utilization of test results from the traditional focus upon a single test, a single chemical, and a single EC50 endpoint to a class of similar tests of different chemicals and the utilization of a whole dose-response surface for endpoints. The test data were used in this paper as an example for demonstrating the stated emphasis. Toxicity tests with plants often produce stimulatory response at low dose levels and contain variabilities due to natural differences in the population of test organisms. The dose-response curve from these tests cannot be reduced using conventional probit analysis.

Keywords: *Toxicity, *Herbicides, *Plants(Botany), *Test methods, Metals, Laboratory animals, Response, Mice, Biomass, Growth, Tests, Comparison, Errors, Copper, Concentration(Composition), Reprint, *Arabidopsis thaliana, Picloram, L-50, Copper chelate.

PB94-160488/REB PC **A02/MF A01**
Uptake and Photodegradation of 2,3,7,8-Tetrachlorodibenzo-p-dioxin Sorbed to Grass Foliage. Journal article.
Corvallis Environmental Research Lab., OR.
J. K. McCrady, and S. P. Maggard. c1993, 10p EPA/600/J-94/162
Pub. in Environmental Science and Technology, v27 n2 p343-350 1993. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR.

Plant uptake rates were determined for airborne 2,3,7,8-TCDD using grass foliage. The primary elimination mechanisms for 2,3,7,8-TCDD from grass, photodegradation and volatility, were measured in natural sunlight, filtered sunlight which reduced UV-B radiation, and in the dark. Rapid sorption of 2,3,7,8-TCDD vapor to grass resulted in an initial uptake rate constant of 1750/h(-1). Photodegradation of 2,3,7,8-TCDD and volatility of 2,3,7,8-TCDD from the foliage back into the air were both significant elimination mechanisms. The rapid photodegradation of 2,3,7,8-TCDD sorbed to grass indicates this elimination mechanism should be considered when estimating plant contamination from 2,3,7,8-TCDD. (Copyright (c) 1993 by the American Chemical Society.)

Keywords: *Sunlight, *Dioxin, *Photodegradation, *Grasses, Vapor phases, Herbicides, Vegetation, Ultraviolet radiation, Volatility, Sorption, Exposure, Humans, Contamination, Darkness, Mathematical models, Half life, Furans, *Dioxin/Tetrachloro dibenzo, Air to vegetation bioconcentration, Plant uptake, Ultraviolet B radiation.

PB94-160496/REB PC **A02/MF A01**
Vapor-Phase 2,3,7,8-TCDD Sorption to Plant Foliage: A Species Comparison. Journal article.
Corvallis Environmental Research Lab., OR.
J. K. McCrady. c1994, 9p EPA/600/J-94/163
Pub. in Chemosphere, v28 n1 p207-216 1994.

Plant uptake rate constants (k sub 1) were determined for vapor-phase 2,3,7,8-TCDD using grass, azalea, spruce, kale and pepper foliage, and the fruit from apple, tomato and pepper. Plants were exposed to vapor-phase (supra 3H-)2,3,7,8-TCDD for 96 h, and the TCDD sorption rate constant for each plant species was determined from measured air and plant concentration. Sorption rate constants for the different plant tissues, expressed on a fresh weight basis, varied by two orders of magnitude. The cuticular wax content of the different plant species did not effect the short-term sorption kinetics of 2,3,7,8-TCDD.

Keywords: *Plants(Botany), *Dioxin, *Vapor phases, *Exposure, *Air pollution, Sorption, Herbicides, Grasses, Vegetables, Fruits, Plant tissues, Constants, Reaction kinetics, Mathematical models, Reprint, *Dioxin/Tetrachloro dibenzo, Plant uptake.

PB94-160504/REB PC **A03/MF A01**
Global Terrestrial Carbon Cycle. Journal article.
Corvallis Environmental Research Lab., OR.
T. M. Smith, W. P. Cramer, R. K. Dixon, R. Leemans, and R. P. Neilson. c1993, 11p EPA/600/J-94/164
Pub. in Water, Air and Soil Pollution 70, p19-37 1993. Prepared in cooperation with Virginia Univ., Charlottesville. Dept. of Environmental Sciences., Institute for Climate Impact Research, Potsdam (Germany)., Rijksinstituut voor de Volksgezondheid en Milieuhygiene, Bilthoven (Netherlands)., and Forest Service, Corvallis, OR.

There is great uncertainty with regard to the future role of the terrestrial biosphere in the global carbon cycle. The uncertainty arises from both an inadequate understanding of current pools and fluxes as well as the potential effects of rising atmospheric concentrations of CO2 on natural ecosystems. Despite these limitations, a number of studies have estimated current and future patterns of terrestrial carbon storage. Future estimates focus on the effects of a climate change associated with a doubled atmospheric concentration of CO2. Available models for examining the dynamics of terrestrial carbon storage and the potential role of forest management and landuse practices on carbon conservation and sequestration are discussed. (Copyright (c) 1993 Kluwer Academic Publishers.)

Keywords: *Carbon cycle, *Ecology, *Global aspects, Climatic change, Carbon dioxide, Biological productivity, Land use, Vegetation, Biomass, Organic matter, Air-biosphere interactions, Man-environment interactions, Reprint.

PB94-160512/REB PC **A03/MF A01**
Interaction of Climate and Land Use in Future Terrestrial Carbon Storage and Release. Journal article.
Corvallis Environmental Research Lab., OR.
A. M. Solomon, I. C. Prentice, R. Leemans, and W. P. Cramer. c1993, 20p EPA/600/J-94/165
Pub. in Water, Air and Soil Pollution, v70 p595-614 1993. Prepared in cooperation with Lund Univ. (Sweden). Dept. of Plant Ecology., Rijksinstituut voor de Volksgezondheid en Milieuhygiene, Bilthoven (Netherlands)., and Institute for Climate Impact Research, Potsdam (Germany).

The processes controlling total carbon (C) storage and release from the terrestrial biosphere are still poorly quantified. We conclude from analysis of paleodata and climatebiome model output that terrestrial C exchanges since the last glacial maximum (LGM) were dominated by slow processes of C sequestration in soils, possibly modified by C starvation and reduced water use efficiency of trees during the LGM. In contrast, future C cycling will be dominated by human activities, not only from increasing C release with burning of fossil fuels, and but also from indirect effects which increase C storage in the terrestrial biosphere and decrease C storage in the biosphere. Comparison of the positive and negative C flux processes involved suggests that if the C sequestration processes are important, they likely will be so during the next few decades, gradually being counteracted by the C release processes. (Copyright (c) 1993 Kluwer Academic Publishers.)

Keywords: *Carbon cycle, *Climatic change, *Land use, Air-biosphere interactions, Climate, Carbon sinks, Carbon dioxide, Uptake, Terrestrial ecosystems, Carbon sources, Biomass, Forests, Fossil fuels, Soils, Environmental impacts, Man-environment interactions, Reprint.

PB94-160520/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Comparison of Two Methods to Assess the Carbon Budget of Forest Biomes in the Former Soviet Union. Journal article.
Oregon State Univ., Corvallis.
T. P. Kolchugina, and T. S. Vinson. c1993, 14p EPA/600/J-94/166
Pub. in Water, Air, and Soil Pollution, v70 p207-221 1993. Sponsored by Corvallis Environmental Research Lab., OR.

The sink of CO2 and the carbon budget of forest biomes of the former Soviet Union (FSU) were assessed with two distinct approaches: (1) ecosystem/ecoregional, and (2) forest statistical data. The ecosystem/ecoregional approach was based on the integration of ecoregions (defined with a GIS analysis of several maps) with soil/vegetation carbon data bases. The forest statistical data approach was based on growing stock, annual increment of timber, and FSU yield tables. Applying the ecosystem/ecoregional approach, the area of forest biomes in the FSU was estimated at 1426.1 Mha (1,000,000 hectares); forest ecosystems comprised 799.9 Mha, non-forest ecosystems and arable land comprised 506.1 and 119.9 Mha, respectively. The FSU forested area was 28 percent of the global area of closed forests. (Copyright (c) 1993 Kluwer Academic Publishers. Printed in the Netherlands.)

Keywords: *Carbon cycle, *Forests, *Terrestrial ecosystems, *USSR, Soils, Carbon dioxide, Vegetation, Maps, Statistical data, Growth, Structural timber, Area, Yield, Estimates, Primary biological productivity, Reprint, *Sinks(Biosphere), Biomes, Phytomass, Mortmass.

PB94-160538/REB PC **A02/MF A01**
Corvallis Environmental Research Lab., OR.
Hexagon Mosaic Maps for Display of Univariate and Bivariate Geographical Data. Journal article.
ManTech Environmental Technology, Inc., Corvallis, OR.
D. B. Carr, A. R. Olsen, and D. White. c1994, 8p EPA/600/J-94/167
Contracts EPA-68-C8-0006, EPA-68-C0-0021
Pub. in Cartography and Geographic Information Systems, v19 n4 p228-236, 271 1992. Prepared in cooperation with Technical Resources, Inc., Rockville, MD. and George Mason Univ., Fairfax, VA. Center for Computational Statistics. Sponsored by Corvallis Environmental Research Lab., OR. and National Science Foundation, Arlington, VA.

The paper presents concepts that motivate the use of hexagon mosaic maps and hexagon-based ray-glyph maps. The phrase 'hexagon mosaic map' refers to maps that use hexagons to tessellate major areas of a map, such as land masses. Hexagon mosaic maps are similar to color-contour (isarithm) maps and show broad regional patterns. The ray glyph, an oriented line segment with a dot at the base, provides a convenient symbol for representing information within a hexagon cell. Ray angle encodes the local estimate for the hexagon. A simple extension adds upper- and lower-confidence bounds as a shaded arc bounded by two rays. Another extension, the bivariate ray glyph, provides a continuous representation for showing the local correlation of two variables. The theme of integrating statistical analysis and cartographic methods appears throughout the paper. Example maps show statistical summaries of acidic deposition data for the eastern United States. These maps provide useful templates for a wide range of statistical summarization and exploration tasks. Correspondingly, the concepts in the paper address the incorporation of statistical information, visual appeal, representational accuracy, and map interpretation.

Keywords: *Mosaic mapping, Geographic distribution, Statistical data, Acid rain, Sulfates, Nitrates, Hexagons, Trends, Reprint, Ray-glyph maps, Bivariate maps.

PB94-160546/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Precision of Variable Sampling When the Response Variable and Inclusion Probabilities Are Not Highly Correlated. Technical rept.
Oregon State Univ., Corvallis. Dept. of Statistics.
S. V. Stehman. Apr 94, 14p EPA/620/R-94/013
Grant EPA-R-816721
Also pub. as Oregon State Univ., Corvallis. Dept. of Statistics rept. no. TR-144. Sponsored by Corvallis Environmental Research Lab., OR.

Variable probability sampling may be less efficient than simple random sampling if the response variable, y, is not highly positively correlated with the auxiliary variable, x, used to select the sample. Simulation results using binary and continuous response variables demonstrate quantitatively how much precision may be lost in this situation. Variable probability sampling may be less efficient for populations with correlations as high as .50, and efficiency relative to simple random sampling may be as low as 25-50% for low correlation populations.

Keywords: *Sampling, *Environmental monitoring, Probability theory, Population(Statistics), Mathematical models, Statistical samples, Variance(Statistics), Correlations, *Variable probability, EMAP(Environmental Monitoring and Assessment Program), Environmental Protection Agency.

PB94-160553/REB PC **A04/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Cadmium and Chromium Recovery from Electroplating Rinsewaters.
Battelle Columbus Div., OH.
A. R. Gavaskar, R. F. Olfenbuttel, J. A. Jones, and L. Brown. Jan 94, 60p EPA/600/R-94/050
Contract EPA-68-C0-0003
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

This evaluation addresses the product quality, pollution prevention, and economic issues involved in the use of ion exchange to recover cadmium and chromium from electroplating rinse waters. Test results showed that the water returned to the rinse after ion exchange was of acceptable quality. On the cadmium line, the ion exchange resin was regenerated with sodium hydroxide solution and the regenerant was subjected to electrolytic metal recovery to recover cadmium for reuse in the plating bath. On the chromium line, the ion exchange resin was regenerated with sodium hydroxide solution and the regenerant was passed through a cation exchange resin in an effort to recover chromic acid. However, due to excess sodium hydroxide in the regenerant, chromic acid could not be recovered with the amount of resin used. The pollution prevention potential of ion exchange on the cadmium and chromium rinse water is good, especially if further testing establishes good recovery of chromic acid. Payback periods of 1 year on the cadmium ion exchange and 8 years on the chromium system are projected.

Keywords: *Materials recovery, *Water pollution abatement, *Electroplating, *Cadmium, *Chromium, Waste water reuse, Recycling, Economic analysis, Ion exchanging, Performance evaluation, Metals, Quality control.

PB94-160561/REB PC **A07/MF A02**
Environmental Research Lab., Narragansett, RI.
Risk Assessment Pilot Study. Phase 3. Naval Construction Battalion Center, Davisville, Rhode Island. Final draft rept.
Science Applications International Corp., Narragansett, RI.
W. R. Munns, C. Mueller, B. A. Rogers, S. Benyi, and S. Cayula. Dec 93, 134p EPA/600/R-94/046, , ERLN/CONTRIB-1428
Contract EPA-68-C1-0005
Prepared in cooperation with Naval Command, Control and Ocean Surveillance Center, San Diego, CA. Sponsored by Environmental Research Lab., Narragansett, RI.

To undertake a marine ecological risk assessment at the Naval Construction Battalion Center (NCBC) Davisville, Rhode Island to determine the effect of hazardous waste disposal on Allen Harbor and Narragansett Bay. Allen Harbor, located in Narragansett Bay at NCBC Davisville, was closed to shellfishing by the Rhode Island Department of Environmental Management because of suspected hazardous waste contamination from a landfill and disposal area adjacent to the harbor. NCBC Davisville was added to the National Priority List in November 1989. Between 1946 and 1972, the 15-acre landfill received a wide variety of wastes, including sewage sludge, solvents, paints, chromic acid, PCB-contaminated waste oils, preservatives, blasting grit, and other municipal and industrial wastes generated at NCBC Davisville and at the Naval Air Station Quonset Point. Another site, also adjacent to Allen Harbor on Calf Pasture Point, was used for disposal of calcium hypochlorite decontaminating solution and chlorides.

Keywords: *Risk assessment, *Hazardous wastes, *Waste disposal, *Water pollution effects, *Aquatic ecosystems, Marine biology, Earth fills, Rhode Island, Military facilities, Shellfish, Municipal wastes, Industrial wastes, Narragansett Bay, Naval Construction Battalion Center, Davisville(Rhode Island), Allen Harbor.

PB94-160579/REB PC **A07/MF A02**
Corvallis Environmental Research Lab., OR.
Regionalization of the Western Corn Belt Plains Ecoregion. Final rept.
Terrene Inst., Inc., Washington, DC.
J. A. Bernert, J. M. Eilers, W. J. Ripple, and K. E. Freemark. Apr 94, 131p EPA/600/R-94/037
Prepared in cooperation with E and S Environmental Chemistry, Inc., Corvallis, OR. Sponsored by Corvallis Environmental Research Lab., OR.

As part of a larger effort to study the fate and transport of agrichemicals in the midwestern United States, the U.S. Environmental Protection Agency commissioned a study of spatial variability within the Western Corn Belt Plains ecoregion. The objective of this study was to systematically partition the study area into subregions that best reflected the ecological diversity of the region. A process was developed which relied to a large degree on small-scale digital data to quantify spatial concordance among data sets, group data sets into related themes, assign boundaries based on spatially-variable contingency statements, and reflect the uncertainty in transition zones between subregions using variable width boundaries. Some of the most prominent ecological units were identified on the basis of surficial geology, soils, vegetation, and land use. The systematic methodology used offers advantages over some previous methods for identifying ecological regions.

Keywords: *Agriculture, *Pesticides, *Chemical compounds, *Ecosystems, *Boundaries, *Pollution prevention, Digital techniques, Mapping, Species diversity, Geology, Land use, Soils, Vegetation, Iowa, *Corn Belt, *Midwest Region(United States).

PB94-160587/REB PC A05/MF A01
Validation of VOC Emissions Inventories by Source Apportionment and (14)C Dating Methods. Part 1. Research rept.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
C. W. Lewis. Apr 94, 81p EPA/600/R-94/045

The report brings together two conference papers and a journal article (published or in press) which collectively summarize work to date under the JEIOG-supported effort to examine the utility of receptor modeling in the validation of VOC emissions inventories. All have undergone EPA peer and administrative review, as well as whatever outside review was required by the conference or journal to which each was submitted. The report puts in perspective their accomplishments and relationships, and previews the remaining work to be done.

Keywords: *Volatile organic compounds, *Validation, *Pollution sources, *Air pollution sampling, Carbon 14, Mathematical models, Concentration(Composition), Forecasting, Ozone, Isotope dating, *Emission inventories, Receptor models.

PB94-160595/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Strategy for Use of Found Samples in a Rigorous Monitoring Design. Technical rept.
Oregon State Univ., Corvallis. Dept. of Statistics.
W. S. Overton. Apr 94, 23p EPA/620/R-94/012
Also pub. as Oregon State Univ., Corvallis. Dept. of Statistics rept. no. TR-139. Sponsored by Corvallis Environmental Research Lab., OR.

In the context of a probability sample, data from found samples have a high potential of misinference. Careful attention to representativeness is required to provide assurance that the found data are coherent with the probability sample data. A strategy of establishing representativeness by a process of similarity analyses is proposed, with similarity perceived relative to the use to which the found data are to be put. Two cases are developed. In one, the found sample is structured as a quasi-probability sample, and combined with the probability sample. In the other, the found sample is structured as a quasi-double sample, and used in the manner of a double sample of the probability sample.

Keywords: *Sampling, *Environmental monitoring, Population(Statistics), Mathematical models, Probability theory, Statistical samples, Algorithms.

PB94-160603/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Thermal Desorption Treatment (February 1994). Engineering bulletin.
Science Applications International Corp., Cincinnati, OH.
J. Rawe, and E. Saylor. Feb 94, 11p EPA/540/S-94/501
Contract EPA-68-C0-0048
See also PB91-228080, PB93-126597 and PB93-133387. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The bulletin discusses various aspects of the thermal desorption technology including applicability, limitations of its use, residuals produced, performance data, site requirements, status of the technology, and sources of further information. The document is an update of the original bulletin published in May 1991 (PB92-228080).

Keywords: *Superfund, *Waste treatment, Soil treatment, Hazardous materials, Heat treatment, Remediation, Land pollution control, Technology utilization, *Thermal desorption, Volatile organic compounds, Ex situ remediation, Treatment technology.

PB94-160611/REB PC A06/MF A02
Corvallis Environmental Research Lab., OR.
EMAP Status Estimation: Statistical Procedures and Algorithms.
Oregon State Univ., Corvallis. Dept. of Statistics.
V. M. Lesser, and W. S. Overton. Apr 94, 103p EPA/620/R-94/008
See also PB92-103449. Sponsored by Corvallis Environmental Research Lab., OR.

The report presents statistical procedures collected from other Environmental Monitoring and Assessment Program (EMAP) documents, as well as from Oregon State University technical reports describing data analyses for other U.S. Environmental Protection Agency (EPA) designs. By integrating the information, the manual and the EMAP design report will serve as reference sources for statisticians who implement an ecological monitoring program based on the EMAP design framework. Spatial and temporal analyses of EMAP data are not covered in this version of the report. A brief discussion of the four-point moving average, which combines data over the inter-penetrating sample, is presented in Overton et al. Algorithms listed in the report cover most design options discussed in the EMAP design report. It is expected that any further realizations of the EMAP design will also include documentation of corresponding variance estimators.

Keywords: *Environmental monitoring, *Statistical analysis, *Manuals, Algorithms, Confidence limits, Statistical data, Distribution functions, Ecosystems, Biological indicators, Procedures, Estimates, Statistical inference, Sampling, US EPA, Reprint, *Horvitz-Thompson formulae, *EMAP(Environmental Monitoring and Assessment Program).

PB94-160629/REB PC A04/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Evaluation of Supercritical Carbon Dioxide Technology to Reduce Solvent in Spray Coating Applications.
Battelle, Columbus, OH.
K. J. Heater, A. B. Parsons, and R. F. Olfenbuttel. Apr 94, 59p EPA/600/R-94/043
Contract EPA-68-C0-0003, R PB94160538
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The evaluation, part of the Pollution Prevention Clean Technology Demonstration (CTD) Program, addresses the product quality, waste reduction, and economic issues of spray paint application using supercritical carbon dioxide (CO_2). Union Carbide has developed the technology and is currently marketing this process under the UNICARB trademark. The report reviews the UNICARB process as it is used in the application of nitrocellulose lacquer finish on a chair finishing line at the Pennsylvania House Furniture Company in White Deer, Pennsylvania. It also provides a comparative analysis between the conventional spray application methods previously used on the chair finishing line and the new UNICARB process. The report demonstrates that use of the UNICARB process can result in a net reduction in volatile organic compounds (VOCs) without increasing other wastestream products of disposal costs or negatively affecting product quality. The equipment costs and other factors that affect the return on investment for the process can be variable, but a payback period of five years is estimated for the process as implemented at the White Deer facility.

Keywords: *Supercritical fluids, *Carbon dioxide, *Spray coating, *Pollution prevention, Organic solvents, Substitutes, Paints, Aerosols, Woodworking, Industrial wastes, Diluents, Quality control, Cost engineering, Nitrocellulose, Chairs, Lacquers, Furniture industry, *Clean Technology Demonstration Program, *UNICARB process, *VOCs(Volatile organic compounds), Waste minimization.

PB94-160637/REB PC A08/MF A02
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Chemical Waste Management, Inc. PO*WW*ER (Trade Name) Evaporation-Catalytic Oxidation Technology. Technology Evaluation Report. Volume 1. Rept. for Jun-Oct 92.
PRC Environmental Management, Inc., Chicago, IL.
C. Petropoulou, S. Labunski, L. Unger, J. Michaels, and R. Riesing. Sep 92, 167p EPA/540/R-93/506A
Contract EPA-68-C0-0047
See also PB94-124658, PB91-127415 and Volume 2, PB94-160660. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

As part of the Superfund Innovative Technology Evaluation (SITE) Program, the U.S. Environmental Protection Agency (EPA) demonstrated the Chemical Waste Management, Inc. (CWM), PO*WW*ER(tm) technology. The SITE demonstration was conducted in September 1992 at CWM's Lake Charles Treatment Center (LCTC) site in Lake Charles, Louisiana. During the demonstration, the PO*WW*ER(tm) system treated landfill leachate contaminated with volatile organic compounds (VOC), semivolatile organic compounds (SVOC), metals, ammonia, cyanide, and other inorganic contaminants. SITE demonstration results show that during treatment in the PO*WW*ER(tm) system, the volume of the landfill leachate was significantly reduced. A total solids (TS) concentration ratio of 32 to 1 was achieved. The SITE demonstration results also show that the PO*WW*ER(tm) system effectively removed sources of toxicity such as VOCs, SVOCs, metals, ammonia, and cyanide. Concentrations of VOCs and SVOCs in product condensate exiting the PO*WW*ER(tm) system were below their respective detection limits of 5 to 10 micrograms per liter (micrograms/L) and 10 to 130 micrograms/L.

Keywords: *Chemical wastes, *Superfund, *Waste treatment, *Water pollution control, *Liquid wastes, Inorganic compounds, Volatile organic compounds, Hazardous materials, Oxidation, Evaporation, Waste water, Technology assessment, Sampling, Air pollution control, Pilot plants, Catalysts, Leaching, Earth fills, Performance evaluation, Cost analysis, Quality assurance, *PO*WW*ER System, *Innovative treatment technologies, Chemical Waste Management Incorporated, Superfund Innovative Technology Evaluation Program.

PB94-160652/REB PC A07/MF A02
Environmental Protection Agency, Washington, DC.
Getting Started: A Guide to Bringing Environmental Education into Your Classroom.
Michigan Univ., Ann Arbor. School of Natural Resources and Environment.
D. Bones. c1994, 141p ISBN-1-884782-00-0
Prepared in cooperation with National Environmental Education and Training Foundation, Washington, DC. Sponsored by Environmental Protection Agency, Washington, DC.

The manual is primarily a collecton of stories about everyday teachers who initiated not-so-everyday environmental programs in their classrooms and schools. Throughout the book are brief sections covering educational materials and resources, funding, environmental education workshops and in-service opportunities, and the locations of other educators interested in environmental education. The manual is divided into three units. The first provides a brief overview of the scope, history, and value of environmental educational. The second offers suggestions for instructional materials, funding, workshops, courses, and in-service opportunities in environmental education. The third unit includes information on networking with other enviromental educators, securing grants for your EE program, dealing with a growing EE project, and locating awards, scholarships and stipends that are available for environmental educators and their students.

Keywords: *Environment management, *Education, *Curriculum development, Ecology, Environment pollution, Natural resources management, Teaching methods, Instruction materials, Curricula, Students, Instructors, Project planning, Manuals, Environmental education.

PB94-160660/REB PC A21/MF A04
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Chemical Waste Management, Inc. PO*WW*ER (Trade Name) Evaporation-Catalytic Oxidation Technology. Technology Evalution Report. Volume 2. Final rept. Jun-Oct 92.
PRC Environmental Management, Inc., Chicago, IL.
Nov 93, 500p EPA/540/R-93/506B
Contract EPA-68-C0-0047
See also Volume 1, PB94-160637. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The PRC SITE Team conducted sampling and analysis for the SITE demonstration of the Chemical Waste

Management, Inc. (CWM) PO*WW*ER process at the Lake Charles Treatment Center in Carlyss, Louisiana. Samples were collected on September 24, 25, 26, 28, 29, and 30, 1992. During the first three days of sampling, the PO*WW*ER process operated with natural (unspiked) feed waste. For the last three days of sampling, the feed waste was spiked with sulfate salts of cadmium, copper, nickel, iron and mercury, and with phenol, toluene, tetrachloroethene, and methylene chloride. This report presents results and quality assurance/quality control (QA/QC) data for samples analyzed by Engineering-Science, Inc., along with vent gas emission rate and volumetric concentration results calculated from Ross analytical data. Analytical results are presented in Section 2.0. QA/QC results are presented in Section 3.0. Re-extraction and reanalysis results for brine samples are presented and discussed in Section 4.0. Appendix A contains chain of custody forms associated with the samples, and Appendix B contains a key to sample identification.

Keywords: *Chemical wastes, *Superfund, *Waste treatment, *Liquid wastes, *Water pollution sampling, Waste water, Quality assurance, Quality control, Extraction, Volatile organic compounds, Catalysts, Evaporation, Oxidation, Technology assessment, Tables(Data), Forms(Paper), Leaching, Toxicity, Concentration(Composition), Analytical techniques, *PO*WW*ER System, *Innovative treatment technologies, Chemical Waste Management Incorporated, Superfund Innovative Technology Evaluation Program.

PB94-160678/REB PC **A14/MF A03**
Environmental Research Lab., Gulf Breeze, FL.
Agricultural Insecticide Runoff Effects on Estuarine Organisms: Correlating Laboratory and Field Toxicity Tests, Ecophysiology Bioassays, and Ecotoxicological Biomonitoring.
South Carolina Univ., Columbia. School of Public Health.
G. I. Scott, M. H. Fulton, M. C. Crosby, P. B. Key, and J. W. Daugomah. Jan 94, 316p EPA/600/R-94/004
Prepared in cooperation with National Ocean Survey, Rockville, MD. Office of Estuarine Sanctuaries and Reserves. and Agency for Toxic Substances and Disease Registry, Atlanta, GA. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

The study compared in situ, field and laboratory toxicity testing results for several insecticides (azinphosmethyl - an organophosphate; endosulfan - an organochlorine, and fenvalerate - a synthetic pyrethroid) with ecotoxicological biomonitoring results from the macropelagic, estuarine tidal creek community in pristine habitats and in areas receiving significant insecticide runoff from agriculture. Field studies were conducted over a four-year period (1985-88) at several coastal field sites on Wadmalaw (Leadenwah Creek) and Johns (unnamed tidal creek near Kiawah Island) island, coastal sea islands located just south of Charleston, South Carolina. Results indicated that laboratory and field toxicity testing and biomonitoring methodologies should be integrated to provide holistic environmental risk assessments for pesticides. Laboratory toxicity tests provide the initial bench mark for estimating toxic effects. In situ, field toxicity tests provide a mechanism to validate initial laboratory tests and expand their design to test differences in formulations, life history stages, pulsed versus continuous dose, salinity interactions, and pesticide mixtures for more realistic estimates of effects of field exposures. Application of this method in the environmental risk assessment for three classes of pesticides (organochlorines-endosulfan, pyrethroids-fenvalerate, and organophosphates-azinphosmethyl) has been demonstrated in assessing the effects of nonpoint source agricultural runoff on sensitive estuarine tidal creek fauna in South Carolina.

Keywords: *Farms, *Storm water runoff, *Pesticides, *Toxicity, *Water pollution effects, Bioassay, Aquatic ecosystems, Fisheries, Insecticides, Habitats, Field tests, Estuaries, Monitoring, Shrimps, Kiawah Island, Oranic phosphates, Chlorine organic compounds, Mortality, Risk assessment, Tables(Data), *Charleston(South Carolina), Organisms, Fenvalerate, Integrated pest management.

PB94-160686/REB PC **A05/MF A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Review and Assessment of Factors Affecting Hydraulic Conductivity Values Determined from Slug Tests. Final rept.
Connecticut Univ., Storrs. Dept. of Geology and Geophysics.
G. K. Binkhorst, and G. A. Robbins. Feb 94, 77p EPA/600/R-93/202
Grants EPA-R-817587-01, EPA-R-817587-02
Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

The purpose of the study was to evaluate factors that influence hydraulic conductivity values determined by slug tests in typical monitoring wells. Procedures for conducting tests and methods for analyzing test results are summarized and compared. Sensitivity analyses were conducted to identify and evaluate the factors influencing the calculated hydraulic conductivity values for available slug test solutions. These factors include mathematical approximation of the shape of the screen intake, the presence of a less or more permeable well skin, determination of the radius of influence, formation anisotropies and heterogeneities, partial penetration and boundary conditions, and filter sand pack drainage from wells with screens that span the water table (partially submerged well screens). A method is presented to calculate the filter sand's specific yield from hydraulic head versus time curves for incorporation into existing slug test solutions.

Keywords: *Ground water, *Hydraulic conductivity, *Water wells, *Water pollution control, Monitoring, Test methods, Mathematical models, Permeability, Drainage, Fluid filters, Sands, Water table, Hydrogeology, Darcys Law, Aquifers, Water storage, *Slug tests, *Submerged well screens, Fines.

PB94-160694/REB PC **A10/MF A03**
Environmental Monitoring and Assessment Program: Agroecosystem Pilot Field Program Plan, 1993.
Environmental Protection Agency, Washington, DC. Environmental Monitoring and Assessment Program.
C. L. Campbell, J. Bay, C. D. Franks, A. S. Hellkamp, and N. P. Helzer. Oct 93, 219p EPA/620/R-93/014
See also PB93-100071. Prepared in cooperation with Agricultural Research Service, Raleigh, NC., Soil Conservation Service, Lincoln, NE., EG and G Idaho, Inc., Idaho Falls., and North Carolina State Univ. at Raleigh.

The Agroecosystem Resource Group (ARG) of the Environmental Monitoring and Assessment Program (EMAP) has developed a five-year (1991-1995) strategy for the development, evaluation, and implementation of a suite of indicators for monitoring agroecosystem status and trends on a regional and national basis. The five-year period includes time to test concepts relating to design, indicators, quality assurance, logistics, information management, data analysis, assessment and reporting at the pilot and demonstration program stages. A primary emphasis is on the development of close working relations between personnel from the U.S. Department Agriculture's (USDA) National Agricultural Statistics Service (NASS) and Soil Conservation Service (SCS) and the ARG. The 1993 Pilot Project in Nebraska will test all aspects of the monitoring program for a selected suite of indicators. The 1993 pilot will have sufficient flexibility to allow a number of innovative approaches to be examined in the various facets of the pilot.

Keywords: *Environmental monitoring, *Agriculture, *Ecosystems, *Project planning, Habitats, Bioindicators, Trends, Design criteria, Quality assurance, Technology innovation, Logistics, Nebraska, Statistical analysis, Regions, Soil conservation, Governmental policies, Research management, Geographic areas, Pilot projects.

PB94-161064/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Field Performance of Woodburning Stoves in Crested Butte, Colorado (Journal Article). Rept. for Oct 88-Jun 90.
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mechanical Engineering.
D. R. Jaasma, M. Gundappa, M. R. Champion, and R. C. McCrillis. c1993, 18p EPA/600/J-94/054
Grant EPA-A00818389
Pub. in Environmental Monitoring and Assessment, v24 p189-204 1993. See also PB92-113133. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses field emissions from woodstoves measured in Crested Butte, Colorado, during the winters of 1988-89 and 1989-90. Both particulate matter and carbon monoxide emissions were measured. The database from the work is large, including conventional stoves and EPA-certified stoves of the catalytic and noncatalytic types. The data are discussed and compared to results of other field studies. (Copyright (c) 1993 Kluwer Academic Publishers. Printed in the Netherlands.)

Keywords: *Stoves, *Wood burning appliances, *Air pollution control, Emission, Combustion products, Measurement, Carbon monoxide, Catalytic converters, Comparison, Field tests, Performance evaluation, Reduction, Reprint, Particulates, Noncatalytic converters, Stationary sources.

PB94-161122/REB PC **A08/MF A02**
WATERS: Well Activities Tracking, Evaluation and Reporting System. Version 2.0 User Guide.
Environmental Protection Agency, Washington, DC. Office of Water.
Oct 93, 153p EPA/813/B-93/002

The Well Activities Tracking, Evaluation, and Reporting System (WATERS) is a user friendly PC-based system designed by EPA's Underground Injection Control Branch (UICB). EPA developed WATERS to assist State and Regional Offices in operating and managing their UIC programs. Primary users include primacy States and Regional Direct Implementation (DI) Programs. The system tracks the following types of well-specific data: Permits; Inventory; Inspections; Mechanical Integrity Tests; Enforcement Actions and Compliance Status; Operational Characteristics.

Keywords: *Program management, *Water wells, *Guidelines, *Permits, *Water pollution control, Injection wells, Tracking, Installing, States(United States), Regions, Computer programs, Requirements, Inventories, Law enforcement, Inspection, Diskette, Mechanical tests, Operations, Training.

PB94-161130/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Wash Solvent Reuse in Paint Production.
Battelle, Columbus, OH.
A. B. Parsons, K. J. Heater, and R. F. Olfenbuttel. Apr 94, 44p EPA/600/R-94/063
Contract EPA-68-CO-0003
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The project evaluated solvent used to clean paint manufacture equipment for its utility in production of subsequent batches of solvent-borne paint. Reusing wash solvent would reduce the amount of solvent disposed of as waste. The evaluation of this wash-solvent recovery technology was conducted by Battelle Memorial Institute for the Pollution Prevention Research Branch of the U.S. Environmental Protection Agency. The evaluation was conducted with the cooperation and assistance of Vanex Color, Inc. The product quality, waste reduction/pollution prevention, and economic impacts of this technology change, as it has been implemented by Vanex, were examined. Two batches of a solvent-borne alkyd house paint were prepared at Vanex--one batch made with 100%-new solvent and the other with 30%-wash solvent--and sampled for laboratory analysis at Battelle.

Keywords: *Production, *Paints, *Paint removers, *Solvents, *Pollution prevention, *Economic impacts, Equipment, Cleaning, Waste minimization, Evaluation, Paint applicators, Alkyd resins, Risk assessment, Quality control, Test methods, Operating costs, *Paint manufacturing.

PB94-161163/REB PC **A07/MF A02**
Customer Incentives for Water Conservation: A Guide.
Environmental Protection Agency, Washington, DC. Office of Water.
G. S. Fiske, and R. A. Weiner. Feb 94, 150p EPA/230/R-94/001

The handbook is intended as a guide to help water agencies through the process of selecting incentives that and appropriate and cost-effective for their jurisdiction. It also provides a cost-effectiveness framework to help the agency determine how much of an incentive customers need to participate in the program and how much of an incentive the agency can afford to offer.

Keywords: *Water conservation, *Incentives, *Handbooks, Water consumption, California, Urban areas, Rebates, Audits, Water demand, Government policies, State government, Local government, Water management, Plumbing, Technology utilization, Cost effectiveness, Financial assistance, Case studies, Cash transfer.

PB94-161171/REB PC **A03**/MF **A01**
Handbook for State Ground Water Managers.
Environmental Protection Agency, Washington, DC. Office of Water.
May 92, 28p EPA/813/B-92/001

Table of Contents:
- Nonpoint Source Implementation;
- State Public Water System Supervision;
- State Underground Water Source Protection (Underground Injection Control);
- Water Pollution Control -- State and Interstate Program Support (106 Grants);
- Water Quality Management Planning;
- Agriculture in Concert with the Environment;
- Consolidated Pesticide Compliance Monitoring and Program Cooperative Agreements;
- Pollution Prevention Incentives for States;
- Hazardous Substance Response Trust Fund;
- Hazardous Waste Financial Assistance;
- Underground Storage Tank Program;
- Leaking Underground Storage Tank Trust Fund;
- State/EPA Data Management Financial Assistance Program;
- Environmental Education;
- and Multi-Media Assistance Agreements for Indian Tribes.

Keywords: *Ground water, *Water pollution abatement, *State agencies, Federal programs, Grants, Financial assistance, Nonpoint sources, Water supply, Hazardous materials, Storage tanks, Underground storage, Pesticides, Agriculture, Water pollution sources.

PB94-161189/REB PC **A03**/MF **A01**
Hydrogeologic Mapping Needs for Ground-Water Protection and Management. Workshop Report. Held in Denver, Colorado on May 10-12, 1988.
Environmental Protection Agency, Washington, DC. Office of Water.
Jan 90, 37p EPA/440/6-90/002
Prepared in cooperation with Geological Survey, Denver, CO.

The workshop's purpose was to better define the hydrogeologic mapping needs of States and other organizations responsible for the protection and management of ground-water resources, and to identify areas in which more consistency in map content and design would be useful. Approximately 50 participants addressed mapping objectives and priorities, and discussed mapping attributes, scale, display and dissemination. Major results included definition of the types of information that are most needed, such as aquifer-system definition, and specific map attributes that are required such as transmissivity. Other identified needs included larger scale maps, consistency in the scales used and data format, and leadership by Federal, State, and professional organizations. Advantages and disadvantages of geogrpahic information systems were identified.

Keywords: *Ground water, *Water pollution abatement, *Mapping, *Meetings, Aquifers, Water quality management, Subsurface investigations, Hydrogeology, Land use, Water flow, Aquifer characteristics, Vulnerability, Geographic information systems, State government, National government, Private organizations.

PB94-161205/REB PC **A03**/MF **A01**
Possible Requirements of the Ground-Water Disinfection Rule.
Environmental Protection Agency, Washington, DC. Office of Water.
20 Jun 91, 22p EPA/570/9-91/900

The purpose of this document is to present possible ground-water disinfection requirements and to solicit feedback from the public. The document consists of two sections: (1) Ground-Water Disinfection Draft Rule Criteria, and (2) Rationale for the Ground-Water Disinfection Draft Rule Criteria. The Draft Rule Criteria section (sometimes referred to as the Draft Rule Criteria documents) specifies a set of possible requirements for the Ground-Water Disinfection Rule (GWDR). The Rationale section describes the purpose and structure of the rule, and provides a brief explanation of some of the outstanding issues raised in the Draft Rule Criteria section.

Keywords: *Disinfection, *Requirements, Chemical removal(Water treatment), Microorganism control(Water), Law enforcement, Regulations, Standards compliance, Water pollution control, Water quality, Potable water, Water supply, Local government, State government, *Ground Water Disinfection Rule, Safe Drinking Water Act, Community water systems, Noncommunity water systems.

PB94-161213/REB PC **A03**/MF **A01**
PWSS Program Priority Guidance.
Environmental Protection Agency, Washington, DC. Office of Water.
Jun 92, 16p EPA/812/X-92/001

The guidance presents three categories of activities: (1) A list of base minimum State functions, implementation of which EPA considers critical to a State's ability to maintain primacy; (2) A list of the highest priorities of the Office of Ground Water and Drinking Water and its regional counterparts in administering the PWSS Program; (3) A list of EPA and State oversight priorities by rule.

Keywords: *Drinking water, *Water treatment, Water supply, Water distribution, Public utilities, Water quality, Responsibility, Standards, Law enforcement, State government, Water pollution abatement, Pollution regulations, *PWSS(Public Water System Supervision), Safe Drinking Water Act, Volatile organic compounds.

PB94-161221/REB PC **A03**/MF **A01**
Lead Leaching from Submersible Well Pumps. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Prevention, Pesticides and Toxic Substances.
Apr 94, 18p EPA/747/F-94/001

This fact sheet is concerned with drinking water submersible well pumps. Some submersible well pumps are made of stainless steel and plastic components but the majority are constructed with brass fittings contained in a cast brass housing. While the plastic and stainless pumps do not pose a problem with lead leaching, EPA is concerned for residents of homes and other buildings with submersible well pumps made with brass fittings, because the brass alloys used in such pumps contain lead. These pumps have the potential to leach high levels of lead into drinking water, especially if the water is soft and corrosive.

Keywords: *Water wells, *Pumps, *Water pollution, *Potable water, *Lead(Metal), Leaching, Environmental effects, Public information, Water quality, Health hazards.

PB94-161239/REB PC **A20**/MF **A04**
Federal Register Volume 58 No. 222, Friday, November 19, 1993 Notices. Part 2. Water Pollution Control, NPDES General Permits and Fact Sheets: Storm Water Discharges from Industrial Activity; Notice.
Environmental Protection Agency, Washington, DC. Office of Water.
19 Nov 93, 454p

The report provides notice for draft National Pollutant Discharge Elimination System general permits and accompanying fact sheets for storm water discharges associated with industrial activity in EPA Regions I, II, III, IV, VI, VIII, IX, and X.

Keywords: *Storm water runoff, *Permits, *Industrial wastes, Water pollution control, Waste water, Water pollution standards, Pollution regulations, Requirements, Administrative procedures, Sewers, Water treatment, Industrial plants, Industry, NPDES(National Pollutant Discharge Elimination System).

PB94-161247/REB PC **A03**/MF **A01**
Federal Register Citations for the Safe Drinking Water Act: A Compilation of References.
Environmental Protection Agency, Washington, DC. Office of Water.
Mar 94, 39p EPA/810/B-94/004

This is a compilation of citations for drinking water-related FEDERAL REGISTER notices.

Keywords: *Potable water, *Bibliographies, Water pollution, Water quality, Pollution regulations, Standards, Law enforcement, Responsibility, Ground water, Surface waters, Water treatment, Water supply, Injection wells, Water wells, Toxic substances, Hazardous materials, State government, National government, Literature surveys, *Safe Drinking Water Act, Federal Register, National Primary Drinking Water Regulations.

PB94-161254/REB PC **A11**/MF **A03**
Report to the United States Congress on Radon in Drinking Water: Multimedia Risk and Cost Assessment of Radon.
Environmental Protection Agency, Washington, DC. Office of Water.
Mar 94, 230p EPA/811/R-94/001

EPA prepared the report in response to the Congressional mandate in Public Law 102-389 (the Chafee-Lautenberg Amendment to EPA's Appropriation Bill, enacted October 6, 1992) which directs the Administrator of the U.S. Environmental Protection Agency (EPA) to report to Congress on EPA's findings regarding the risks of human exposure to radon, the costs for controlling or mitigating that exposure, and the risks posed by treating water to remove radon.

Keywords: *Radon, *Drinking water, *Risk assessment, *Cost analysis, Path of pollutants, Public health, Neoplasms, Inhalation, Ingestion(Biology), Biological radiation effects, Exposure, Radionuclide migration, Cost estimates, Dose-response relationships, Pollution regulations, Potable water, Contaminant levels.

PB94-161270/REB PC **A06**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Field Performance of Woodburning Stoves in Crested Butte during the 1991-92 Heating Season.
Final rept. Nov 91-Apr 92.
Virginia Polytechnic Inst., Blacksburg. Dept. of Mechanical Engineering.
D. R. Jaasma, C. H. Stern, and M. Champion. Apr 94, 118p EPA/600/R-94/061
Grant EPA-R-819599-01-0
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The 1991-92 field performance of eleven woodburning stoves in and around Crested Butte, CO, was evaluated. Measurements included particulate matter (PM), carbon monoxide (CO), total unburned hydrocarbons (THC), and weekly average burn rates. The monitored stoves included EPA-certified catalytic stoves and EPA-certified noncatalytic stoves. The main emphasis of this continuing study is to characterize the emissions of EPA certified stoves as they age with normal use. The emissions of a previously monitored Phase II noncatalytic stove appeared to be unchanged when variations in fuel moisture content and burn rate were taken into account. A second Phase II noncatalytic stove also performed at the emission levels which had been observed for noncatalytic stoves in previous monitoring.

Keywords: *Woodburning appliances, *Stoves, *Air pollution sampling, Particulates, Carbon monoxide, Hydrocarbons, Exhaust emissions, Burning rate, Catalytic combusters, Air pollution control, Colorado, Field tests, Performance evaluation, Crested Butte(Colorado).

PB94-161338/REB PC **E99/MF E99**
Hazardous Air Pollutant Emmisions from Process Units in the Synthetic Organic Chemical Manufacturing Industry: Background Information for Final Standards.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Mar 94, 1124p 1124p in 6v*
Set includes PB94-161346 through PB94-161395.

No abstract available.

PB94-161346/REB PC **A11/MF A03**
Hazardous Air Pollutant Emissions from Process Units in the Synthetic Organic Chemical Manufacturing Industry: Background Information for Final Standards. Volume 2A. Comments on Process Vents, Storage Vessels, Transfer Operations, and Equipment Leaks. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Mar 94, 227p* EPA/453/R-94/003A
See also PB93-156552 and Volume 2B, PB94-161353.
Also available in set of 6 reports PC E99/MF E99, PB94-161338.

This background information document (BID) provides summaries and responses for public comments received regarding the Hazardous Organic National Emission Standard for Hazardous Air Pollutants (NESHAP), commonly referred to as the HON. The HON will primarily affect the Synthetic Organic Chemical Manufacturing Industry (SOCMI). However, the provisions for equipment leaks also apply to certain polymer and resin production processes, certain pesticide production processes, and certain miscellaneous processes that are subject to the negotiated regulation for equipment leaks. Volume 2A is organized by emission point and contains discussions of specific technical issues related to process vents, storage vessels, transfer operations, and equipment leaks. Volume 2A discusses specific technical issues such as control technology, cost analysis, emission estimates, Group 1/Group 2 determination, compliance options and demonstrations, and monitoring.

Keywords: *Environmental impact statements-final, *Organic chemical industry, *Air pollution control, Chemical plants, Petrochemicals, Hazardous materials, Chemical wastes, Exhaust emissions, Storage tanks, Leaks, Vents, Valves, Pumping, Vapors, Inspection, Air pollution standards, Standards compliance, Cost analysis, Economic impact, NESHAP(National Emission Standard for Hazardous Air Pollutants), Volatile organic compounds.

PB94-161353/REB PC **A11/MF A03**
Hazardous Air Pollutant Emissions from Process Units in the Synthetic Organic Chemical Manufacturing Industry: Background Information for Final Standards. Volume 2B. Comments on Wastewater. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Mar 94, 241p* EPA/453/R-94/003B
See also PB93-156560, Volume 2A, PB94-161346, and Volume 2C, PB94-161361.
Also available in set of 6 reports PC E99/MF E99, PB94-161338.

This background information document (BID) provides summaries and responses for public comments received regarding the Hazardous Organic National Emission Standard for Hazardous Air Pollutants (NESHAP), commonly referred to as the HON. The HON will primarily affect the Synthetic Organic Chemical Manufacturing Industry (SOCMI). Volume 2B addresses issues related to controlling emissions from wastewater. Specific technical issues include control technology, cost analysis, emission estimates, Group 1/Group 2 determination, compliance options and demonstrations, and monitoring.

Keywords: *Environmental impact statements-final, *Organic chemical industry, *Air pollution control, Chemical plants, Petrochemicals, Hazardous materials, Chemical wastes, Waste water, Exhaust emissions, Biological treatment, Water treatment, Stripping(Distillation), Vaporizing, Heat exchange, Air pollution standards, Standards compliance, Cost analysis, Economic impact, NESHAP(National Emission Standard for Hazardous Air Pollutants), Steam stripping, Volatile organic compounds.

PB94-161361/REB PC **A10/MF A03**
Hazardous Air Pollutant Emissions from Process Units in the Synthetic Organic Chemical Manufacturing Industry: Background Information for Final Standards. Volume 2C. Comments on Emissions Averaging. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Mar 94, 210p* EPA/453/R-94/003C
See also PB93-156578, Volume 2B, PB94-161353, and Volume 2D, PB94-161379.
Also available in set of 6 reports PC E99/MF E99, PB94-161338.

This background information document (BID) provides summaries and responses for public comments received regarding the Hazardous Organic National Emission Standard for Hazardous Air Pollutants (NESHAP), commonly referred to as the HON. The HON will primarily affect the Synthetic Organic Chemical Manufacturing Industry (SOCMI). Volume 2C contains the EPA's decisions regarding emissions averaging. Specific issues include the scope of emissions averaging in the HON, specific provisions related to credits and banking, and enforcement of an emissions averaging system for the HON.

Keywords: *Environmental impact statements-final, *Organic chemical industry, *Air pollution control, Chemial plants, Petrochemicals, Hazardous materials, Chemical wastes, Exhaust emissions, Law enforcement, Credits, Banking, Limits, Policies, Pollution regulations, Risk assessment, Air pollution standards, Standards compliance, Cost analysis, Economic impact, NESHAP(National Emission Standard for Hazardous Air Pollutants), Emission averaging, Toxicity weighting, Volatile organic compounds.

PB94-161379/REB PC **A10/MF A03**
Hazardous Air Pollutant Emissions from Process Units in the Synthetic Organic Chemical Manufacturing Industry: Background Information for Final Standards. Volume 2D. Comments on Applicability, National Impacts, and Overlap with Other Rules. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Mar 94, 214p* EPA/453/R-94/003D
See also Volume 2C, PB94-161361 and Volume 2E, PB94-161387.
Also available in set of 6 reports PC E99/MF E99, PB94-161338.

This background information document (BID) provides summaries and responses for public comments received regarding the Hazardous Organic National Emission Standard for Hazardous Air Pollutants (NESHAP), commonly referred to as the HON. The HON will primarily affect the Synthetic Organic Chemical Manufacturing Industry (SOCMI). Volume 2D discusses applicability of the HON in terms of selection of source category, selection of source, and selection of pollutants. Volume 2D also addresses the process for determination of the MACT floor and selection of the specific applicability thresholds for process vents, storage vessels, transfer racks, wastewater operations, and equipment leaks.

Keywords: *Environmental impact statements-final, *Organic chemical industry, *Air pollution control, Chemical plants, Petrochemicals, Hazardous materials, Chemical wastes, Exhaust emissions, Law(Jurisprudence), Pollution regulations, Air pollution standards, Standards compliance, Air pollution sources, Sectoral analysis, Responsibility, Policies, Law enforcement, Cost analysis, Economic impact, NESHAP(National Emission Standard for Hazardous Air Pollutants), Applicability, Volatile organic compounds.

PB94-161387/REB PC **A08/MF A02**
Hazardous Air Pollutant Emissions from Process Units in the Synthetic Organic Chemical Manufacturing Industry: Background Information for Final Standards. Volume 2E. Comments on Recordkeeping, Reporting, Compliance and Test Methods. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Mar 94, 161p* EPA/453/R-94/003E
See also Volume 2D, PB94-161379 and Volume 2F, PB94-161395.
Also available in set of 6 reports PC E99/MF E99, PB94-161338.

This background information document (BID) provides summaries and responses for public comments received regarding the Hazardous Organic National Emission Standard for Hazardous Air Pollutants (NESHAP), commonly referred to as the HON. The HON will primarily affect the Synthetic Organic Chemical Manufacturing Industry (SOCMI). Volume 2E discusses the provisions for compliance, recordkeeping and reporting. Volume 2E also discusses issues related to the use of EPA test methods.

Keywords: *Environmental impact statements-final, *Organic chemical industry, *Air pollution control, Chemical plants, Petrochemicals, Hazardous materials, Chemical wastes, Exhaust emissions, Reporting, Testing, Records management, Test methods, Air pollution standards, Standards compliance, Cost analysis, Economic impact, NESHAP(National Emission Standard for Hazardous Air Pollutants), Record keeping, Volatile organic compounds.

PB94-161395/REB PC **A04/MF A01**
Hazardous Air Pollutant Emissions from Process Units in the Synthetic Organic Chemical Manufacturing Industry: Background Information for Final Standards. Volume 2F. Comments on Identification List. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Mar 94, 71p* EPA/453/R-94/003F
See also Volume 2E, PB94-161387.
Also available in set of 6 reports PC E99/MF E99, PB94-161338.

This background information document (BID) provides summaries and responses for public comments received regarding the Hazardous Organic National Emission Standard for Hazardous Air Pollutants (NESHAP), commonly referred to as the HON. The HON will primarily affect the Synthetic Organic Chemical Manufacturing Industry (SOCMI). Volume 2F of each volume contains a list of commenters, their affiliations, and the EPA docket and item number assigned to each comment.

Keywords: *Environmental impact statements-final, *Organic chemical industry, *Air pollution control, Chemical plants, Petrochemicals, Hazardous materials, Chemical wastes, Exhaust emissions, Air pollution standards, Standards compliance, Cost analysis, Economic impact, NESHAP(National Emission Standard for Hazardous Air Pollutants), Comments, Dockets, Volatile organic compounds.

PB94-161437/REB PC **A01/MF A01**
Pesticide Fact Sheet: (E,E) - 8.10-Dodecadien-1-o1.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Feb 94, 5p EPA/737/F-94/002

The document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or groups of pesticides. (E,E)-8,10-Dodecadien-1-o1 is registered for both end-use and manufacturing-use. The end-uses include uses on apples, pears, walnuts, peaches, nectarines, quince, plums and prunes at a rate of 12.6 to 16.8 grams/acre every 60 days or sooner, as based on monitoring results and field scouting. (E,E)-8,10-Dodecadien-1-o1 controls the coding moth via mating disruption.

Keywords: *Pesticides, *Registration, *Environmental effects, Toxicity, Risk assessment, Exposure, Animals, Biological insect control, Sex attractants, Pheromones, Pollution regulations, Use patterns, CAS 33956-49-9.

PB94-161494/REB PC **A09/MF A02**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
PM-10 Innovative Strategies: A Sourcebook for PM-10 Control Programs. Final rept.
Montana Univ., Missoula.
G. A. Jacobs. Dec 93, 177p EPA/452/R-93/016
Contract EPA-93-2006
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
See also PB90-502022 and PB94-104304.

This document provides information on innovative strategies designed to control PM-10 emissions. The document is being provided to encourage States to develop innovative ways of controlling PM-10 in their State implementation plans. The document covers several strategies including marketable permits, transportation control measures, fees, subsidies, and tax code provisions. A general description accompanies each strategy, followed by area-specific programs, references and local-level contacts. The document also includes a section which discusses general criteria to consider in program selection. In addition, Appendix A includes attachments which provide actual regulatory language from some of the strategies discussed. Appendix B includes a list of contacts and Appendix C a list of documented areas.

Keywords: *Particulates, *Air pollution control, *Technology innovation, *Air pollution economics, *Financial incentives, Wood fuels, State government, Air pollution abatement, Permits, Pollution regulations, Penalties, Information transfer, Requirements, Pollution laws, Economic factors, Funds, Product development, Fees, *Economic incentives.

PB94-161544/REB PC **A03/MF A01**
Biological and Water Quality Survey of Three Tributaries to the Sangamon River: South Fork Basin, Mosquito Creek and Long Point Slough, September through November 1989.
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
M. B. Short. Oct 93, 36p IEPA/WPC/93-143

During September through November, 1989, the Illinois Environmental Protection Agency central monitoring unit collected biological, water and sediment chemistry, and instream habitat data on three tributaries to the Sangamon River. The study included ten sites in the South Fork basin and one site each on Mosquito Creek and Long Point Slough. The purpose of the study was to update use support data on these streams. Prior to the survey, the area was experiencing a drought. Rainfall was 8.92 inches below average in 1988 and 7.34 inches below average in 1989.

Keywords: *Aquatic biology, *Invertebrates, *Habitats, *Water pollution effects, *Sagamon River, Fishes, Population growth, Sites, Surveys, Chemical analysis, Water quality data, Sediments, Watersheds, Stream flow, Illinois, Tables(Data), *South Fork of Sangamon River, Macroinvertebrates, Tributaries, Long Point Slough, Mosquito Creek.

PB94-161668/REB PC **A02/MF A01**
RED Facts: Boric Acid. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Sep 93, 9p EPA/738/F-93/006
See also PB94-160017.

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. The pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet 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: *Boric acids, *Pesticides, *Toxic substances, Regulations, Risk assessment, Exposure, Insecticides, Environmental effects, Labels, Utilization, Fungicides, Herbicides, Public health, Requirements, US EPA, *Reregistration, Chemical information fact sheet, Use patterns.

PB94-161783/REB PC **A03/MF A01**
Intensive Survey of the Edwards River and Pope Creek, 1991.
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
M. W. Joseph. Oct 93, 45p IEPA/WPC/93-141

The Edwards River and Pope Creek watersheds are located in west central Illinois and drain portions of Henry, Knox and Mercer Counties. Combined the Edwards River and Pope Creek drain approximately 650 square miles before discharging into the Mississippi River at rever mile 431.2 and 426, respectively. Watershed land use is principally agricultural. This survey included fish and macroinvertebrate community evaluation, water and sediment chemistry analyses, physical habitat assessment, Biological Stream Characterization and aquatic life use support assessment in order to identify the nature, extent and distribution of Illinois stream resources. Excluding the uppermost reaches of the Edwards River, overall stream resource quality was good. The degradation observed was generally attributed to non-point sources.

Keywords: *Aquatic biology, *Invertebrates, *Edwards River, *Water pollution effects(Animals), Streams, Drainage, Watersheds, Surveys, Fresh water fishes, Habitats, Water quality data, Pope Creek, Sediment transport, Chemical analysis, Degradation, Nonpoint sources, Chlorine organic compounds, Metals, Evaluation, Illinois, Macroinvertebrates.

PB94-161833/REB PC **A04/MF A01**
Intensive Survey of the Vermilion River Basin Illinois River Drainage.
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
M. B. Short, and W. H. Ettinger. May 93, 66p IEPA/WPC/93-142
See also PB91-193649 and PB94-104361.

During July through October, 1990, the Illinois Environmental Protection Agency and the Illinois Department of Conservation conducted an intensive survey of the Vermilion River basin. The Vermilion River drains approximately 1331 square miles primarily in LaSalle and Livingston counties along with small portions of Ford, McLean, and Woodford counties before flowing into the Illinois River near Oglesby, Illinois. The survey consisted of 11 stations on the Vermilion River and 19 stations on fifteen tributaries. Data collected at each site included fish and macroinvertebrate communities, instream habitat, water and sediment chemistry. Fish tissue samples were collected when appropriate species were available. A total of 58 fish species and two hybrids were collected in the Vermilion River basin. Fish samples from Mud Creek included the greater redhorse (Moxostoma valenciennsi), a state endangered species, not previously recorded from this basin.

Keywords: *Fishes, *Aquatic biology, *Vermilion River Basin, *Water pollution effects, Surveys, Populations, Invertebrates, Aquatic animals, Habitats, Chemical analysis, Sediments, Mercury(Metal), Bioassay, Tissues(Biology), Concentration(Composition), Illinois, Tables(Data), Endangered species, *Moxostoma valenciennsi, Macroinvertebrates, Tributaries, Greater redhorse fish.

PB94-161916/REB PC **A02/MF A01**
Pesticide Fact Sheet: Deltramethrin.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
2 Mar 94, 8p EPA/737/F-94/003

The fact sheet provides an overview of chemical, physiological, toxicological, and biochemical characteristics for the insecticide deltramethrin (as known as decamethrin). It also summarizes the ecological effects and environmental fate.

Keywords: *Pesticides, *Registration, Insecticides, Toxicity, Risk assessment, Exposure, Environmental effects, Pollution regulations, Environmental transport, *Deltramethrin, Decamethrin, Pyrethoids, CAS 52918-63-5.

PB94-162450/REB PC **A04/MF A01**
Heavy-Duty Engine Testing Report Non-Road Engine Configuration Test Results, 1991. Technical rept.
Environmental Protection Agency, Ann Arbor, MI. Technology Evaluation and Testing Support Branch.
M. Doorlag, and M. Samulski. Jul 92, 72p EPA/AA/TETSB-94/01
See also PB93-236164.

The report describes the exhaust emissions results from three heavy-duty diesel engines. Two 140 hp John Deere 6068 engines and one 1991 model year, 130 hp Ford New Holland engine were tested. Exhaust emission testing included EPA Heavy-Duty Federal Test Procedures transient emission tests and 8-Mode steady-state tests. Each engine was tested for exhaust emissions of hydrocarbons, carbon monoxide, nitrogen oxides and particulate matter. The report includes engine and fuel descriptions, test procedures and test results.

Keywords: *Tractor engines, *Construction equipment, *Air pollution, Tests, Exhaust emissions, Carbon monoxide, Nitrogen oxides, Diesel engines.

PB94-162542/REB PC **A03/MF A01**
Chesapeake Bay Policy for the Introduction of Non-Indigenous Aquatic Species.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Dec 93, 32p CBP/TRS-112/94

The introduction of non-indigenous species into an ecosystem has been known to create problems for existing species in that ecosystem. Further, in jurisdictions that share an ecosystem, the decision of one jurisdiction to permit the introduction of a species can affect the ecosystem shared with the other jurisdictions. The states of Maryland, Pennsylvania, and Virginia, and the District of Columbia, which share the Chesapeake Bay basin and are signatories to the 1987 Chesapeake Bay Agreement, seek to institute a process by which they can cooperate with one another in making decisions regarding the introduction of non-indigenous species. The Living Resources Subcommittee (LRSC) of the Chesapeake Bay Program was charged by the Implementation Committee with developing a policy to provide guidance to the Chesapeake Bay Agreement signatories on the intentional (e.g. rainbow trout) and unintentional (e.g. zebra mussel) introduction of non-indigenous aquatic species in the Chesapeake basin. This policy document considers only first time introductions of non-indigenous, non-naturalized aquatic species.

Keywords: *Government policies, *Chesapeake Bay, *Aquatic animals, *Aquatic ecosystems, *Environmental protection, Fishes, Shellfish, Jurisdiction, Aquatic plants, Watersheds, Proposals, Economic factors, Risk assessment, Permits, Monitoring, Ballast tanks, Drainage, Regulations, States(United States), National government, *Exotic species, *Non-Indigenous Aquatic Nuisance Prevention and Control Act of 1990, Tributaries, Zebra mussels.

PB94-162658/REB PC **A03/MF A01**
Environmental Research Lab.-Narragansett, Newport, OR. Mark O. Hatfield Marine Science Center.
Optimizing Composite Sampling Protocols.
State Univ. of New York at Stony Brook. Dept. of Ecology and Evolution.
F. J. Rohlf, H. R. Akcakaya, and S. P. Ferraro. Apr 94, 32p EPA/600/R-94/048, , ERLN-N197
Contract EPA-68-CO-0051
Also pub. as State Univ. of New York at Stony Brook. Dept. of Ecology and Evolution rept. no. CONTRIB-795. See also PB87-221164. Prepared in cooperation with Applied Biomathematics, Setauket, NY. Sponsored by Environmental Research Lab.-Narragansett, Newport, OR. Mark O. Hatfield Marine Science Center.

Composite samples are often used in environmental monitoring programs to reduce costs by decreasing the number of expensive tests that have to be performed. Statistical models for composite sampling are discussed and procedures given for determining the optimal number of primary sampling units to include in each composite sample. For the problem of comparison of means, methods are presented (1) to find the optimum sampling protocol that stays within a fixed budget and (2) to find the least costly sampling protocol that is still able to reliably detect a specific difference in means. Problems with estimating the statistical distribution of the priamry sampling units or of their variance when data have been collected from composite samples are also discussed.

Keywords: *Environmental monitoring, *Statistical sampling, *Value engineering, Statistical quality control, Statistical distributions, Variance(Statistics), Convolution integrals, Collection methods, Statistical data, Mathematical models, *Composite samples, *Grab samples.

PB94-162682/REB PC A03/MF A01
Investigation of Cleaner Technologies to Minimize Automotive Coolant Wastes. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
P. M. Randall. c1993, 11p EPA/600/J-94/172
Pub. in Jnl. of Cleaner Production, v1 n2 p67-75 1993. See also PB91-148387, PB92-126804 and PB92-153444.

The U.S. Environmental Protection Agency in cooperation with the State of New Jersey evaluated chemical filtration and distillation technologies designed to recycle automotive and heavy-duty engine coolants. These evaluations addressed the product quality, waste reduction, and economic issues. In addition, the authors examined the potential for substituting propylene glycol for ethylene glycol based engine coolant formulations. (Copyright (c) 1993 Butterworth-Heinemann Ltd.)

Keywords: *Motor vehicle engines, *Cooling systems, *Waste recycling, *Coolants, *Waste minimization, Automobiles, Heavy duty vehicles, Distillation, Fluid filtration, Economic analysis, Quality control, Product development.

PB94-162690/REB PC A03/MF A01
Pollution Prevention Opportunities in the Manufacture of Paint and Coatings. Conference proceedings.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
P. M. Randall. 1994, 14p EPA/600/A-94/069
Pub. in Proceedings of the Pollution Prevention Conference on Low and No-VOC Coatings, San Diego, CA., May 25-27, 1993, p489-499. Prepared in cooperation with Research Triangle Inst., Research Triangle Park, NC.

The paints and coatings industry is rapidly changing to meet environmental and economic pressures. There are many pollution prevention methods for the paint manufacturing industry which vary from very simple, inexpensive measures to new, expensive plant/equipment. The methods, techniques or programs can generally be classified as either recycling or source reduction and may involve material substitution, process or equipment modification, revised operating practices, operating procedures (such as waste stream segregation), personnel practices (such as operator training), loss prevention practices, or accounting practices. This paper will provide an overview of these practices, in-place at particular manufacturing facilities to reduce wastes and associated costs, to be a more competitive industry that must still maintain quality and performance of its product.

Keywords: *Paint industry, *Waste recycling, *Pollution abatement, Coatings, Pigments, Pollution control, Industrial wastes, Waste utilization, Materials recovery, Waste management, Reprint, Waste minimization, Source reduction.

PB94-162708/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Improved Equipment Cleaning at Coated and Laminated Substrate Manufacturing Facilities (Seminar Paper). Rept. for Nov 92-Nov 93.
TRC Environmental Corp., Chapel Hill, NC.
B. W. McMinn, J. B. Vitas, and M. Kosusko. 1994, 13p EPA/600/A-94/065
Contracts EPA-68-D2-0181, EPA-68-02-0173
See also PB94-141157. Presented at the 1994 Technical Seminar, Pressure Sensitive Tape Council, Schaumburg, IL., May 4-6, 1994. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses an investigation of cleaning requirements and pollution prevention options for equipment cleaning in the coated and laminated substrate manufacturing industry. The investigation, assisted by trade associations and industry personnel, identified two industrial segments: large, dedicated-line and small, batch-processing facilities. Although both segments use similar cleaning methods, each has very specific cleaning requirements. Demonstration visits were conducted at small, batch-processing and small, dedicated-line facilities. The results of the demonstrations showed several ways by which emissions and waste from equipment cleaning could be reduced. The demonstrated techniques included consolidation of currently used cleaning materials, successful use alternative cleaners, and reduction in the quantity of material used for cleaning.

Keywords: *Pollution control, *Cleaning agents, *Laminates, *Coatings, Organic solvents, Manufacturing, Waste disposal, Site investigations, Toxic substances, Substrates, Toluene, Stationary sources, Substitutes, Tape wrapping, Adhesive tapes, *Pollution prevention.

PB94-162716/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Potential Surrogate Metals for Incinerator Trial Burns. Conference proceedings.
Acurex Environmental Corp., Jefferson, AR.
L. P. Waterland, and D. J. Fournier. 1994, 11p EPA/600/A-94/068
Contract EPA-68-C9-0038
Pub. in Proceedings of the 1993 Incineration Conference, Knoxville, TN., May 3-7, 1993, p434-440. See also PB90-263864, PB90-263872, PB91-223388 and PB91-223396. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Over the past four years, the research program at the Environmental Protection Agency's (EPA's) Incinerator Research Facility (IRF) has developed an extensive body of metals partitioning data from pilot-scale incineration tests using synthetic hazardous wastes, actual listed hazardous wastes, and contaminated materials from Superfund sites. Because metals volatility dominates partitioning, surrogates can be used and the choice of surrogates is simplified. The paper discusses the results of three extensive parametric test programs performed at the IRF using synthetic hazardous wastes containing both hazardous constituent and potential surrogate metals. These results show that surrogates partition in the same manner as selected hazardous constituent metals. Thus, the use of surrogates deserves consideration, if not in actual trial burns, then at least in scoping tests used to guide the formal trial burn.

Keywords: *Incinerators, *Scrubbers, *Hazardous materials, *Air pollution control equipment, *Meetings, Pilot plants, Combustion efficiency, Heavy metals, Mercury, Separation, Trace amounts, Kilns, Temperature, Burning rate, Materials replacement, Volatility, Concentration(Composition), Solid waste disposal, Wet methods, Performance evaluation, Reprint, *Trial burn, *Metal partitioning.

PB94-162724/REB PC A03/MF A01
Engineering Application of Biooxidation Processes for Treating Petroleum-Contaminated Soil. Book chapter.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
C. Y. Fan, and A. N. Tafuri. 20 Oct 92, 17p EPA/600/A-94/067
Pub. in Remediation of Hazardous Waste Contaminated Soils, p373-401. See also PB90-187220.

Throughout the U.S., the need for effective treatment of petroleum contaminated soil has escalated due to the increase in the number of underground storage tank (UST) systems being upgraded in response to EPA regulations. Remedial options for excavated contaminated soil have in the past been limited to disposal in land treatment facilities or treatment by thermal processes. The report reviews and assesses the state-of-the-art of bio-oxidation technologies, focusing upon aboveground soil mounds. Information presented includes factors that affect biodegradation, types of biotreatment systems, a survey of construction and performance characteristics, design considerations, cost estimates and research recommendations.

Keywords: *Soil treatment, *Petroleum products, Storage tanks, Fuel storage, Leakage, Biological treatment, Aerobic processes, Biodegradation, Oxidation, Remediation, Chemical reactions, Reaction kinetics, Soil contamination, Land pollution control, Reprint, *Biooxidation.

PB94-162732/REB PC A02/MF A01
RBC Nitrification Design Using Zero-Order Kinetics. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
E. J. Opatken. Nov 93, 6p EPA/600/J-94/168
Pub. in Environmental Progress, v12 n4 p262-265 Nov 93. See also PB84-199561.

The design of rotating biological contactor (RBC) systems for nitrifying municipal wastewater or leachates from hazardous waste landfills is based on empirical curves developed by various manufacturers of RBCs. The applicability of zero-order nitrification kinetics to the rate of oxidation or disappearance of ammonia nitrogen (NH3-N) in RBCs has been previously established. The purpose of this paper is to illustrate the use of zero-order kinetics to incorporate nitrification in the design of an RBC treatment facility, illustrate the effect of temperature on the number of RBC units required, and define the rationale behind the steps employed in the design process. A step-by-step design procedure is presented as an example design problem.

Keywords: *Sewage treatment, *Industrial waste treatment, *Nitrification, *Reaction kinetics, Water pollution control, Design criteria, Hazardous materials, Sewage treatment effluents, Temperature, Concentration(Composition), Arrhenius equation, Retention, Performance standards, Reprint, *RBC(Rotating biological contactor), Hydraulic retention time.

PB94-162740/REB PC A03/MF A01
Robert S. Kerr Environmental Research Lab., Ada, OK.
Remediation of Contaminated Soils by Solvent Flushing. Journal article.
Florida Univ., Gainesville. Dept. of Soil and Water Science.
D. C. M. Augustijn, R. E. Jessup, P. S. C. Rao, and A. L. Wood. c1994, 18p EPA/600/J-94/169
Contract EPRI-RP-2879-7, Grant EPA-R-820678
Pub. in Jnl. of Environmental Engineering, v120 n1 p42-57 Jan/Feb 94. See also PB92-180025 and PB92-180074. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK. and Electric Power Research Inst., Palo Alto, CA.

Solvent flushing is a potential technique for remediating a waste disposal/spill site contaminated with organic chemicals. This technique involves the injection of a solvent mixture (e.g., water plus alcohols) that enhances contaminant solubility, reduces the retardation factor, and increases the release rates of the contaminants. A simulation model is developed to predict contaminant elution curves during solvent flushing for the case of one-dimensional, steady flow through a contaminated medium. Column experiments are conducted with a Eustis fine sand that is initially equilibrated with an aqueous naphthalene solution, and then eluted with different methanol-water mixtures to remove the naphthalene. The model simulations, based on parameter values estimated from literature data agree well with the measured elution profiles. Solvent flushing experiments, where the soil was initially equilibrated with a solution of naphthalene and anthracene, show that compounds with different retardation factors are separated at low cosolvent contents, while coelution of the compounds occurs at higher contents. (Copyright (c) ASCE 1994.)

Keywords: *Waste disposal, *Volatile organic compounds, *Ground water, *Water pollution control, *Superfund, Soils, Contamination, Solvent extraction, Materials recovery, Remedial action, Mathematical models, Injection, Flushing, Alcohols, Reduction(Chemistry), Environmental transport, Naphthalene, Carbinols, Tables(Data), Reprint, Chemical spills, Cleanup.

PB94-162757/REB PC A03/MF A01
Natural Bioreclamation of Alkylbenzenes (BTEX) from a Gasoline Spill in Methanogenic Groundwater. Book chapter.
Robert S. Kerr Environmental Research Lab., Ada, OK.
J. T. Wilson, D. H. Kampbell, and J. Armstrong. 1994, 17p EPA/600/A-94/066
Pub. in Hydrocarbon Bioremediation, p201-218 1994. Prepared in cooperation with Traverse Group, Inc., Ann Arbor, MI., Battelle, Columbus, OH., Civil Engineering Lab. (Navy), Port Hueneme, CA., and Air Force Center for Environmental Excellence, Brooks AFB, TX.

A spill of gasoline from underground storage tanks (USTS) at the Sleeping Bear Dunes National Lakeshore in Benzie County, Michigan, produced a plume of contamination that reached the banks of the Platte

River. The plume was short (70 feet) and it had a short residence time (5 to 53 weeks). The plume was in transmissive glacial sands and gravels. The groundwater is cold (10 to 11 C), hard (alkalinity 200 to 350 milligrams/L), and well buffered (pH 6.1 to 7.6). Along the most contaminated flow path, methanogenesis, nitrate reduction, sulfate reduction, iron reduction, and oxygen respiration accepted enough electrons to destroy 30, 14, 4.2, 1.1, and 0.8 milligrams/L of benzene, toluene, ethylbenzene, and xylenes (BTEX compounds) respectively. The actual concentration of BTEX compounds consumed was 42 milligrams/L.

Keywords: *Oil spills, *Water pollution monitoring, *Alkylated aromatics, Benzene, Toluene, Xylene, Concentration(Composition), Ground water, Plume detection, Geochemistry, Soil pollution, Cluster sampling, Biodegradation, Aviation gasoline, Risk assessment, Platte River, Sleeping Bear Dunes National Lakeshore, Reprint, *In situ bioremediation, *BTEX(Alkylbenzenes), *USTS(Underground storage tanks), *Methanogenesis, Benzie County(Michigan), Intrinsic remediation, Natural remediation.

PB94-162765/REB PC **A02**/MF **A01**
Effects of Three Concentrations of Mixed Fatty Acids on Dechlorination of Tetrachloroethene in Aquifer Microcosms. Journal article.
Robert S. Kerr Environmental Research Lab., Ada, OK.
S. A. Gibson, D. S. Roberson, H. H. Russell, and G. W. Sewell. c1994, 10p EPA/600/J-94/171
Pub. in Jnl. of Environmental Toxicology and Chemistry, v13 n3 p453-460 1994. Prepared in cooperation with ManTech Environmental Technology, Inc., Ada, OK.

Chloroethenes are among the most common organic contaminants of ground water. The biotransformation of these compounds by reductive dechlorination is a promising technology for in situ treatment. The effects of three concentrations of a fatty acids mixture on the reductive dehalogenation of tetrachloroethene (PCE) were studied in methanogenic microcosms. These microcosms were constructed with slurries of aquifer solids collected from an area impacted both by aviation gasoline and chlorinated ethenes at Traverse City, Michigan. PCE was not dechlorinated in microcosms without a fatty acid supplement. Although there were observed differences in the length of the lag time, the amount of ultimately dechlorinated PCE was similar. Of the fatty acids tested in the mixture, butyrate oxidation appeared to be the most probable link to PCE dechlorination. (Copyright (c) Pergamon Press 1994.)

Keywords: *Aquifers, *Dechlorination, *Halohydrocarbons, Fatty acids, Biodegradation, Reduction(Chemistry), Concentration(Composition), Reaction kinetics, Anaerobic conditions, Dehalogenation, Organic solvents, Ground water, Aviation gasoline, Chlorinated organic compounds, Reprint, *Traverse City(Michigan), *Chloroethenes, *In situ bioremediation, PCE(Tetrachloroethene), TCE(Trichloroethene).

PB94-162773/REB PC **A03**/MF **A01**
Landfill Gas Utilization: Database of North American Projects. Rept. for Jul 93-Mar 94.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
S. A. Thorneloe, and J. G. Pacey. 1994, 13p EPA/600/A-94/064
See also PB94-132180 and DE93005983. Presented at SWANA's Annual Landfill Gas Symposium, Long Beach, CA., March 22-24, 1994. Prepared in cooperation with EMCON Associates, San Jose, CA.

Data landfill-gas (LFG)-to-energy projects have been reported for U.S. landfills and to a lesser extent on Canadian projects. The paper describes the LFG-to-energy industry, providing data on the types of projects in North America, the current energy output of these projects,and the trends impacting this industry. Also provided in the paper is a list of the projects in North America and summary statistics of the database that is being collected through the cooperation of industry.

Keywords: *Landfills, *Methane, *Refuse derived fuels, Natural gas, Electric power generation, Resource recovery facilities, Refuse-fueled power plants, Energy sources, Solid waste disposal, Pollution control, Data bases, Research projects, Reprint.

PB94-162781/REB PC **A06**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Laboratory Assessment of the Permeability and Diffusion Characteristics of Florida Concretes. Phase 1. Methods Development and Testing. Final rept. Oct 90-Sep 91.
Acurex Corp., Research Triangle Park, NC.
R. Snoddy. Apr 94, 115p EPA/600/R-94/053
Contract EPA-68-DO-0141
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

Much of Florida's natural soil and sand recovered from the phosphate mining/beneficiation process there contain significant quantities of radium. Buildings constructed on these high-radium soils have been found to contain elevated radon levels. To decrease elevated indoor radon levels, Florida's legislature instructed its Department of Community Affairs to develop new construction standards for radon-resistant buildings, primarily slab-on-grade constructions. Primary research objectives were as follows: to establish the capability to measure concrete's permeability and diffusivity; to measure these parameters in a small sampling of the typical types of Florida concrete; and, if possible, to correlate the physical parameters of the concrete (mix design, porosity, surface finish, etc.) to the measured diffusion and permeability coefficients.

Keywords: *Concrete slabs, *Permeability, *Radon, Florida, Diffusivity, Tests, Porosity, Slab on ground construction, Construction management.

PB94-162807/REB PC **A02**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Fractal-Based Stochastic Interpolation Scheme in Subsurface Hydrology. Journal article.
Auburn Univ., AL. Dept. of Civil Engineering.
F. J. Molz, and G. K. Boman. cNov 93, 8p EPA/600/J-94/170
Pub. in Water Resources Research, v29 n11 p3769-3774 Nov 93. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK. and Tennessee Valley Authority, Chattanooga.

Real porosity and hydraulic conductivity data do not vary smoothly over space, so an interpolation scheme that preserves irregularity is desirable. Such a scheme based on the properties of fractional Brownian motion (fBm) and fractional Gaussian noise (fGn) is presented. Following the methodology of Hewett (1986), the authors test for the presence of fGn in a set of 459 hydraulic conductivity (K) measurements. The use of rescaled-range analysis strongly indicated the presence of fGn when applied to the natural logs of the K data, and the resulting Hurst coefficient (H) was determined to be 0.82. This H value was then used along with the methodology for successive random additions to generate a fBm K interpolation (realization) in the vertical cross section between two wells. The results appeared realistic, and the overall methodology presented herein may serve as an improved basis for a conditional simulation approach to the study of various transport processes in porous media. (Copyright (c) 1993 American Geophysical Union.)

Keywords: *Subsurface flow, *Hydrology, *Stochastic processes, *Interpolation, Porosity, Hydraulic conductivity, Spatial distribution, Temporal distribution, Cross sections, Data interpretation, Brownian movement, Gaussian noise, Mathematical models, Reprint.

PB94-163011/REB PC **A07**/MF **A02**
Chesapeake Bay Basin Toxics Loading and Release Inventory: Basinwide Toxics Reduction Strategy Commitment Report.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Mar 94, 137p CBP/TRS-102/94
See also PB94-113453.

The Chesapeake Bay Basin Toxic Loading and Release Inventory was developed in response to the 1988 Basinwide Toxics Reduction Strategy commitment to establish a baseline on point and nonpoint source loadings of toxic substances to the Bay basin. The inventory is divided into three broad but distinct categories: loadings, fall line loadings, and releases. The Loadings category includes point sources (industrial, municipal, and federal), urban stormwater, atmospheric deposition, and shipping. The category represents actual discharges to tidal and non-tidal surface waters.

Keywords: *Toxicity, *Reduction, *Water pollution, *Chesapeake Bay Basin, Inventories, Environmental impacts, Toxic substances, Discharge, Point sources, Nonpoint sources, Industrial wastes, Municipalities, Government policies, Facilities, Storm water runoff, Urban areas, Atmospheric deposition, Surface waters, Jurisdiction, Cargo transportation, Tables(Charts), *Organic loading, Tributaries.

PB94-163243/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Soil and Fill Laboratory Support - 1991. Florida Radon Research Program. Final rept. Jan-Dec 91.
Florida Univ., Gainesville.
C. E. Roessler, R. Richards, H. Nguyen, D. L. Smith, and C. Vonada. Apr 94, 50p EPA/600/R-94/064
Grant EPA-R-817367-01
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab. and Florida Dept. of Community Affairs, Tallahassee. Codes and Standards Div.

The report gives results of soil analysis laboratory work by the University of Florida in support of the Florida Radon Research Program (FRRP). Work included textural classification, and particle size, moisture, Radium-226, and emanation coefficient determinations. During the period, 124 samples representing 45 sites were submitted. Conclusions from this work include: North Florida observations support earlier conclusions that a large proportion of the fill actually used in Florida construction is of a low radium content, and elevated radium concentrations do occur in some soil and fill samples in actual house constructions.

Keywords: *Radium 226, *Soil tests, *Radionuclide migration, Radiation monitoring, Radionuclide kinetics, Radioecological concentration, Soil chemistry, Earth fills, Soils, Construction materials, Natural radioactivity, Radon, Florida, Gainesville(Florida), Polk County(Florida).

PB94-163417/REB PC **A02**/MF **A01**
RED Facts: Glyphosate. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Sep 93, 8p EPA/738/F-93/011

When a pesticide is eligible for reregistration, EPA announces this and explains why in a Reregistration Eligibility Decision (RED) document. This fact sheet summarizes the information in the RED document for glyphosate. Three salts of glyphosate are used as active ingredients in registered pesticide products. Two of these active ingredients, plus technical grade glyphosate, are contained in the 56 products that are subject to this RED.

Keywords: *Pesticides, Herbicides, Toxicity, Exposure, Risk assessment, Environmental effects, Pollution regulations, Requirements, Labels, Sodium inorganic compounds, *Glyphosate, *Reregistration, Use patterns, CAS 38641-94-0.

PB94-163516/REB PC **A03**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Chromate Reduction and Remediation Utilizing the Thermodynamic Instability of Zero-Valence State Iron.
ManTech Environmental Technology, Inc., Ada, OK.
R. M. Powell, R. W. Puls, and C. J. Paul. c1994, 14p EPA/600/A-94/070
Contract EPA-68-C3-0322
Pub. in Proceedings of the Water Environment Federation Conference on Innovative Solutions for Contaminated Site Management, Miami, FL, March 6-9, 1994, p485-495. See also DE84015123, PB92-114461, and PB93-131480. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

The study examines the reaction kinetics for redox potential change and chromate reduction in stirred batch reactor systems (SBRs) containing a simulated groundwater in the presence and absence of natural aquifer material, using iron filings as the zero-oxidation state chemical. Column experiments were also utilized to evaluate reductive capacity and the potential for

chromate breakthrough. Continuous tracking of the system chemistry, including redox potential, pH, and the concentrations of the chemical species of interest was performed for both types of experiments. Mathematical evaluations of the rates of changes in the SBRs were performed to determine the pseudo-reaction orders with respect to the electron, (measured as redox, or Eh) and chromate, as well as the reaction rates. Results indicate rapid changes in Eh from positive to highly negative values upon introduction of Fe metal to these systems, both in the presence and absence of aquifer material. (Copyright (c) Water Environment Federation 1994.)

Keywords: *Water pollution, *Metals, *Oxidation reduction reactions, *Reaction kinetics, Ground water, Thermodynamic properties, Chromates, Iron, Inorganic compounds, Technology innovation, Chemical reactors, Columns(Process engineering), Toxic substances, Reprint, *Site Remediation Technology, *SBR(Stirred Batch Reactors), Zero-valent iron.

PB94-163524/REB PC A02/MF A01
Multispectral Identification of Chlorine Dioxide Disinfection Byproducts in Drinking Water. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
S. D. Richardson, A. D. Thruston, T. W. Collette, K. S. Patterson, and B. W. Lykins. c1994, 10p EPA/600/J-94/173
Pub. in Environmental Science and Technology, v28 n4 p592-599 1994. See also PB82-163197 and PB84-215508. Prepared in cooperation with Georgia Univ., Athens. Dept. of Chemistry.

The paper discusses the identification of organic disinfection byproducts (DBPs) at a pilot plant in Evansville, IN, which uses chlorine dioxide as a primary disinfectant. Unconventional multispectral identification techniques (gas chromatography combined with high- and low-resolution electron-impact mass spectrometry, low-resolution chemical ionization mass spectrometry, and Fourier transform infrared spectroscopy) were used to identify more than 40 DBPs in finished water at a chlorine dioxide pilot plant in Evansville, IN. Treatment variations included the use of liquid versus gaseous chlorine dioxide and the use of residual chlorine. Among the more unusual compounds identified were a series of maleic anhydrides, which are believed to have been formed from maleic acids during the extraction and concentration process, and halopropanones. (Copyright (c) 1994 American Chemical Society.)

Keywords: *Water pollution detection, *Potable water, *Disinfectants, *Byproducts, *Water treatment, Pilot plants, Water analysis, Chlorine dioxide, Gas chromatography, Maleic anhydrides, Mass spectroscopy, Fourier transform spectrometers, Chemical reactions, Halomethanes, Alternative chemical substitutes, Reprint, Evansville(Indiana), Chemical reaction mechanisms.

PB94-163532/REB PC A02/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Engineered Biofilter for Removing Organic Contaminants in Air. Journal article.
Aluminum Co. of America, Pittsburgh, PA.
P. K. T. Liu, R. L. Gregg, H. K. Sabol, and N. P. Barkley. cMar 94, 7p EPA/600/J-94/174
Grant EPA-R-816813
Pub. in Jnl. of the Air and Waste Management, v44 n3 p299-303, Mar 94. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Biofiltration is an established economic air pollution control technology for removing organic contaminants in air. An engineered biofilter using synthetic media, such as activated carbon, has been developed that shows improvements in removal efficiency, biodegradation and space requirements over the existing filters. This carbon filter has been operated for > 11 months in a bench-top unit, accomplishing > or = 90 percent removal efficiency consistently in a stream containing 10 to 20 ppm of toluene. The mass transfer zone remained stationary and extremely short (1 to 4 seconds of empty bed contact time) during the entire operating period. Compared with existing filters, this engineered filter showed 40 to 80 times greater biodegradation efficiency under the selected conditions, resulting in a decreased space requirement and other advantages in equipment sizing. (Copyright (c) 1994 - Air & Water Management Association.)

Keywords: *Filtration, *Scrubbers, *Air pollution control, Adsorption, Biodegradation, Toluene, Microorganisms, Superfund, Emission, Organic compounds, Toluene, Reprint, Air decontamination, Biological treatment, Bench-scale, Biogrowth.

PB94-163540/REB PC A02/MF A01
Robert S. Kerr Environmental Research Lab., Ada, OK.
Separation of T-MAZ Ethoxylated Sorbitan Fatty Acid Esters by Supercritical Fluid Chromatography. Journal article.
ManTech Environmental Technology, Inc., Ada, OK.
M. Y. Ye, K. D. Hill, and R. G. Walkup. c1994, 7p EPA/600/J-94/175
Contract EPA-68-C8-0025
Pub. in Jnl. of Chromatography A, 662 p323-327 1994. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

The application of supercritical fluid chromatography (SFC) to the analysis of T-MAZ ethoxylated sorbitan fatty acid esters is described. SFC separation methods utilize a density programming technique and a 50 micrometer I.D. capillary column. This work demonstrates that capillary column SFC is a powerful technique for the analysis of complex mixtures of many derivatives of ethoxylated sorbitan fatty acids which is not amenable to gas chromatography or gel permeation chromatography. This work also demonstrates that complex distributions of polyethylene glycol can be resolved. The results of the study show how changes in chromatographic parameters affect the SFC analysis. (Copyright (c) 1994 Elsevier Science B.V.)

Keywords: *Supercritical fluid chromatography, *Carboxylic acid esters, *Pollution control, Capillaries, Columns(Process engineering), Supercritical pressure, Surfactants, Elution, Solubility, Viscosity, Decontamination, Surface contamination, Emulsifiers, Mixtures, Diffusion coefficient, Reprint, *SFC(Supercritical fluid chromatography), *In situ remediation, T-MAZ(T-MAZ ethoxylated sorbitan fatty acid esters).

PB94-163557/REB PC A03/MF A01
Toxicity of Sediments and Sediment Pore Waters from the Grand Calumet River-Indiana Harbor, Indiana Area of Concern. Journal article.
Environmental Research Lab.-Duluth, MN.
R. A. Hoke, J. P. Giesy, M. Zabik, and M. Unger. c1993, 29p EPA/600/J-94/176
Pub. in Ecotoxicology and Environmental Safety 26, p86-112 1993. Prepared in cooperation with Michigan State Univ., East Lansing. and Indiana Univ. Northwest, Gary.

The assessment of contaminated sediments is a difficult task due to the complex nature of the sediment matrix and the potential for exposure of aquatic organisms to in-place contaminants via several routes. Differential species sensitivity also precludes the completion of a meaningful environmental assessment with only one species. Therefore, a battery of assays approach with the Microtox assay, 48 hr Daphnia magna and Ceriodaphnia dubia tests and a 10-day Chironomous tentans test was used to evaluate the toxicity of sediment pore waters and whole sediments from the Grand Calumet River-Indiana Harbor, Indiana area of concern. All toxicity tests indicated that the test fractions (pore water, whole sediment) from each study site were toxic to the test species. A toxic units (TU) approach was used to compare measured TU from each assay with calculated TU based on chemical analyses of pore waters and whole sediments and the results of reference toxicant tests. Based on the results of these analyses, ammonia, polycyclic aromatic hydrocarbons, metals, petroleum hydrocarbons, and biocarbonate ion appear to be the major contaminants of environmental significance to benthic invertebrates within the study area. (Copyright (c) 1993 by Academic Press, Inc.)

Keywords: *Toxicity, *Sediments, *Aquatic ecosystems, *Water pollution effects, *Grand Calumet River, Invertebrates, Exposures, Bioassay, Chemical analysis, Pore pressure, Interstitial water, Toxicity tests, Ammonia, Metals, Polycyclic aromatic hydrocarbons, Petroleum products, Ions, Bicarbonites, Reprint, Indiana Harbor.

PB94-163565/REB PC A02/MF A01
Dioxin-like Toxic Potency in Forster's Tern Eggs from Green Bay, Lake Michigan, North America. Journal article.
Environmental Research Lab.-Duluth, MN.
D. E. Tillitt, T. J. Kubiak, G. T. Ankley, and J. P. Giesy. c1994, 8p EPA/600/J-94/177
Pub. in Chemosphere, v26 n11 p2079-2084 1993. Prepared in cooperation with National Fisheries Contaminant Research Center, Columbia, MO. and Michigan State Univ., East Lansing. Dept. of Fisheries and Wildlife.

The endangered Forster's tern (Sterna forsteri) population on Green Bay, Wisconsin has exhibited symptoms of embryotoxicity, congenital deformities, and poor hatching success. The putative causal agents are planar halogenated hydrocarbons (PHH). The objectives of the study were: (1) to evaluate the toxic potency of PHHs in extracts of Forster's tern eggs taken from Green Bay, Lake Michigan and a reference site, Lake Poygan, WI; and (2) to compare the toxic potencies of the egg extracts with the reproductive data available from the same water bird colonies. The relative toxic potency of the egg extracts was assessed with the H4IIE bioassay system to obtain 2,3,7,8-tetrachlorodibenzo-p-dioxin equivalents (TCDD-EQ). The bioassay results presented here concur with the biological effects and chemical analyses information from other studies on the same Forster's tern colonies. (Copyright (c) 1993 Pergamon Press Ltd.)

Keywords: *Birds, *Toxic tolerances, *Aquatic ecosystems, *Water pollution effects, Halogen organic compounds, Populations, Halohydrocarbons, Eggs, Reproduction(Biology), Sites, Lake Michigan, Endangered species, Toxicity, Concentration(Composition), Signs and symptoms, Bioassay, Lake Poygan, Biochemistry, Comparison, Reprint, *Green Bay(Wisconsin), *Sterna forsteri, Waterfowl, Dioxin/tetrachloro-dibenzo-p, Organic loading.

PB94-163573/REB PC A02/MF A01
QSAR Approach for Estimating the Aquatic Toxicity of Soft Electrophiles (QSAR for Soft Electrophiles). Journal article.
Environmental Research Lab.-Duluth, MN.
G. D. Veith, and O. G. Mekenyan. c1993, 10p EPA/600/J-94/178
Pub. in Quant. Struct.-Act. Relat., v12, p349-356 1993. Prepared in cooperation with Wisconsin Univ.-Superior. Lake Superior Research Inst.

This work demonstrated that descriptors of soft electrophilicity for aromatic chemicals such as average superdelocalizability and LUMO energy could be used together with the hydrophobicity descriptor, log P, to explain the variation of acute toxicity of substituted benzenes, phenols, and anilines to fish. For proelectrophiles, the structure-toxicity relationships accurately predict toxicity when the stereoelectronic parameters were computed for the metabolic activation products. The QSAR for acute toxicity using these molecular descriptors defines a toxicity plane which includes several modes of toxic action. Type (I) narcotics are chemicals located in the region of low reactivity where toxicity varies with hydrophobicity alone. Type (II) narcotics are more toxic than type (I) narcotics at similar values of log P, and the increase can be explained by stronger electronic interactions with cellular soft nucleophiles. Highly reactive soft electrophiles which have dissociating protons such as 2,4-dinitrophenol produce symptoms of respiratory uncouplers. Those without dissociating protons produce symptoms of reactive toxicity consistent with covalent binding. (Copyright (c) 1993 VCH Verlagsgesellschaft mbH.)

Keywords: *Water pollution effects(Animals), *Toxicity, *Fishes, Benzenes, Phenols, Anilines, Narcotics, Molecular energy levels, Tables(Data), Reprint, *QSAR(Quantitative Structure-Activity Relationship), Soft nucleophiles, Soft electrophiles.

PB94-163581/REB PC A03/MF A01
Identification of Ammonia, Chlorine, and Diazinon as Toxicants in a Municipal Effluent. Journal article.
Environmental Research Lab.-Duluth, MN.
L. P. Burkhard, and J. J. Jenson. c1993, 12p EPA/600/J-94/179
Pub. in Archives of Environmental Contamination and Toxicology 25, p506-515 1993. See also PB89-207013 and PB91-127415. Prepared in cooperation with AScI Corp., Duluth, MN.

A toxicity identification evaluation (TIE) was performed on a muncipal effluent, and three toxicants were identified, ammonia, chlorine, and diazinon. The report illustrates the types of data and logic used in performing a TIE which contains common municipal toxicants. Emphasis in this report was place on the data needed for generating the 'weight of evidence' in toxicant confirmation. Phase III, to support the suspect toxicants identified in the TIE process. Multiple Phase III manipulations, when applied to numerous effluent samples, provided consistent results for generating the 'weight of evidence' for the confirmation of ammonia and chlorine as the primary causes of toxicity of this effluent. (Copyright (c) 1993 Springer-Verlag New York Inc.)

Keywords: *Water pollution abatement, *Water pollution control, *Waste water, *Toxic substances, *Water quality, National Pollutant Discharge Elimination System, Toxicity, Municipal wastes, Ammonia, Chlorine, Sampling, Diazinon, Aquatic biology, Analytical techniques, Water pollution standards, Reprint, *Toxicity Identification Evaluations.

PB94-163599/REB PC **A03**/MF **A01**
Environmental Research Lab.-Duluth, MN.
Biomagnification of Bioassay Derived 2,3,7,8-Tetrachlorodibenzo-p-Dioxin Equivalents. Journal article.
Michigan State Univ., East Lansing.
P. D. Jones, G. T. Ankley, D. A. Best, R. Crawford, and N. DeGalan. c1993, 12p EPA/600/J-94/180
Pub. in Chemosphere, v26 n6 p1203-1212 1993. Prepared in cooperation with National Fisheries Contaminant Research Center, Columbia, MO. and Ecological Research Services, Inc., Ann Arbor, MI. Sponsored by Environmental Research Lab.-Duluth, MN. and Fish and Wildlife Service, Washington, DC.

In recent years contamination of the Great Lakes ecosystem with planar chlorinated hydrocarbons (PCHs) has attracted considerable concern due to their known reproductive and teratogenic effects. The H4IIE bioassay has been standardized as a means of measuring the biological potency of a PCH mixture as 2,3,7,8-tetrachloro-p-dibenzodioxin equivalents (TCDD0EQ). Using this bioassay the authors have investigated the biomagnification of TCDD-EQ in a semi-closed ecosystem. The biomagnification of TCDD-EQ is demonstrated and results indicate that the food chain is the major pathway for TCDD-EQ through this ecosystem. The H4IIE assay system is demonstrated to be a viable integrative measure of the total concentration of TCDD-EQ in different trophic levels. (Copyright (c) Pergamon Press Ltd. 1993.)

Keywords: *Pesticides, *Aquatic ecosystems, *Water pollution effects, *Great Lakes, Reprints, Bioassay, Magnification, Chlorinated hydrocarbons, Concentration(Composition), Herbicides, Food chains, Trophic level, Path of pollutants, Biochemistry, Carcinogens, Dioxin/tetrachloro-p-dibenzo.

PB94-163607/REB PC **A03**/MF **A01**
Measures of Reproductive Success and Polychlorinated Biphenyl Residues in Eggs and Chicks of Forster's Terns on Green Bay, Lake Michigan, Wisconsin, 1988. Journal article.
Environmental Research Lab.-Duluth, MN.
H. J. Harris, T. C. Erdman, G. T. Ankley, and K. B. Lodge. c1993, 13p EPA/600/J-94/181
Pub. in Archives of Environmental Contamination and Toxicology 25, p304-314 1993. Prepared in cooperation with Wisconsin Univ.-Green Bay. and Minnesota Univ.-Duluth. Natural Resources Research Inst.

Data on reproductive success of Forster's tern (Sterna forsteri) from Green Bay, Lake Michigan in 1983 are compared with data collected in 1988. In 1988 measures of reproductive performance (hatching success, number of young fledged, and length of incubation) were improved. Concentrations of total polychlorinated biphenyls (PCBs) and planar PCB congeners in the eggs were compared between years. Median total PCB residue was 67% lower in 1988. This corresponds to a 42% reduction in tetrachlorodibenzo-p-dioxin equivalents (TCDD-EQ) from 1983 to 1988. The authors suggest that contaminant reduction and improved reproductive performance were due to low river flows in 1988 and associated reduced PBC loading into Green Bay. (Copyright (c) 1993 Springer-Verlag New York Inc.)

Keywords: *Birds, *Toxic tolerances, *Aquatic ecosystems, *Water pollution effects, *Green Bay, Polychlorinated biphenyls, Lake Michigan, Reproduction(Biology), Concentration(Composition), Performance evaluation, Comparison, Mortality, Wisconsin, Reprint, Pesticide residues, Waterfowl, Dioxin/tetrachloro-dibenzo-p, Sterna forsteri, Organic loading.

PB94-163615/REB PC **A03**/MF **A01**
Air Force Office of Scientific Research, Bolling AFB, DC.
Physiologically-Based Toxicokinetic Modeling of Three Waterborne Chloroethanes in Channel Catfish, 'Ictalurus punctatus'. Journal article.
Environmental Research Lab.-Duluth, MN.
J. W. Nichols, J. M. McKim, G. J. Lien, A. D. Hoffman, and S. L. Bertelsen. c1993, 31p EPA/600/J-94/182
Contract AFOSR-ISSA-89-0060
Pub. in Aquatic Toxicology v27, p83-112 1993. Prepared in cooperation with AScI Corp., Duluth, MN. Sponsored by Air Force Office of Scientific Research, Bolling AFB, DC.

A physiologically-based toxicokinetic model for fish was used to describe the uptake and disposition of three chlorinated ethanes in channel catfish (Ictalurus punctatus). Catfish were simultaneously exposed to 1,1,2,2-tetrachloroethane (TCE), pentachloroethane (PCE), and hexachloroethane (HCE) in fish respirometer-metabolism chambers to assess the kinetics of chemical accumulation in arterial blood and chemical extraction efficiency from inspired water. Chemical residues in tissues were measured at the end of each experiment. These data were used to evaluate the accuracy of model simulations and to form a basis for comparison with information collected previously from rainbow trout. TCE was at or near steady-state in catfish after 48 h. For PCE and HCE the time to steady-state appeared to be considerably longer than 48 h. Parameterized with in vitro chemical partitioning information, the model accurately simulated the accumulation of TCE in arterial blood and its uptake from inspired water, but consistently underestimated the uptake and accumulation of both PCE and HCE. The cause of these discrepancies was not conclusively determined; however, several possible sources of error were evaluated, including physiological and chemical partitioning inputs, and underlying modeling assumptions. A comparison of data sets and modeling efforts for rainbow trout and channel catfish suggests that gross similarities between the two species can be attributed to the comparability of relevant physiological and chemical partitioning parameters.

Keywords: *Channel catfish, *Toxicology, *Chloroethanes, *Water pollution effects(Animals), Biological monitoring, Trout, Tissue distribution, Respiration, Gills, Blood, Physiology, Reprint, Ictalurus punctatus.

PB94-163623/REB PC **A03**/MF **A01**
Behavior and Identification of Toxic Metals in Complex Mixtures: Examples from Effluent and Sediment Pore Water Toxicity Identification Evaluations. Journal article.
Environmental Research Lab.-Duluth, MN.
M. K. Schubauer-Berigan, J. R. Amato, G. T. Ankley, S. E. Baker, and L. P. Burkhard. c1993, 11p EPA/600/J-94/183
Pub. in Archives of Environmental Contamination and Toxicology 24, p298-306 1993. Prepared in cooperation with AScI Corp., Duluth, MN.

Toxicity caused by heavy metals in environmental samples can be assessed by performing a suite of toxicity identification evaluation (TIE) methods. The behavior of metals during TIEs can vary greatly according to sample matrix. Some approaches and precautions in using TIE to identifying metal toxicants in a sample are discussed, using case studies from three effluent and one sediment TIEs. These approaches include responses of metals that erroneously suggest the presence of other toxicants, the bioavailability of metals retained by glass-fiber filtration, and cautionary steps in Phase III to avoid dilution water effects on sample toxicity. (Copyright (c) Archives of Environmental Contamination and Toxicology 1993.)

Keywords: *Toxicity, *Heavy metals, *Water pollution detection, *Sediments, Pore water, Water analysis, Sewage treatment effluents, Industrial water, Correlations, Oxidizers, Zinc, Nickel, Copper, Lead(Metal), Case studies, Contaminants, Cations, Amphipoda, Aquatic animals, Keweenaw Waterway, Chelation, EDTA, Reprint, *TIE(Toxicity identification evaluation), Ceriodaphnia dubia, Hyallela azteca.

PB94-163631/REB PC **A02**/MF **A01**
Alternatives to Methanol-Water Elution of Solid-Phase Extraction Columns for the Fractionation of High Log K(sub ow) Organic Compounds in Aqueous Environmental Samples. Journal article.
Environmental Research Lab.-Duluth, MN.
E. Durhan, M. L'ukasewycz, and S. Baker. 1993, 10p EPA/600/J-94/184
Pub. in Jnl. of Chromatography. v629 p67-74 1993. Prepared in cooperation with AScI Corp., Duluth, MN.

A toxicity-directed method for fractionating non-polar organic toxicants using solid-phase extraction (SPE) is described in phase II of EPA's 'Methods for aquatic toxicity identification evaluations'. The method has been used very successfully to extract and fractionate acutely and chronically toxic complex effluents and ambient waters. However, when fractionating sampling that contain very hydrophotic (high log K(OW)) toxicants the methanol-water elution sequence requires modification for optimum results. An elution modification has been made to the phase II SPE fractionation method for use with aqueous samples which contain such compounds (e.g. sediment pore water). The modified elution and fractionation method has been found to be effective for the separation and isolation of a mixture of compounds with log K(OW) values ranging from 2.5 to 7 from aqueous solution and for toxicants from a sediment pore water sample.

Keywords: *Toxicity, *Organic compounds, *Water pollution detection, *Extraction, *Pore water, Reprint, Methanol, Hydrophobic properties, Solid phases, Sediments, Water analysis, Industrial water, Polycyclic aromatic hydrocarbons, Polychlorinated biphenyls, Aliphatic hydrocarbons, Chromatography, Mass spectrometers, Toxic substances, *TIE(Toxicity identification evaluation), *SPE(Solid phase extraction), HPLC(High performance liquid chromatography).

PB94-163649/REB PC **A03**/MF **A01**
Comparison of Effluent Toxicity Results Using 'Ceriodaphnia dubia' Cultured on Several Diets. Journal article.
Environmental Research Lab.-Duluth, MN.
T. J. Norberg-King, and S. Schmidt. 3 Feb 93, 13p EPA/600/J-94/185
Pub. in Jnl. of Environmental Toxicology and Chemistry, v12 p1945-1955 1993. Presented at the Annual Meeting of the Society of Environmental Toxicology and Chemistry, Seattle, WA., November 3-7, 1991.

Several diets have been proposed for Ceriodaphnia dubia, but no single diet has been universally accepted as optimal for toxicity testing. Although several diets for Ceriodaphnia dubia culturing and testing are commonly used, little or no data exist on whether toxicity varies with the diet. The study evaluated several combinations of yeast-Cerophyl-trout chow (YCT), Selenastrum capricornutum, and Selenastrum capricornutum-Cerophyl foods for routine culture performance and the sensitivity of the offspring in subsequent acute toxicity tests with effluents. The young produced from each of the seven diets were tested in 48-h acute tests with three different effluents across the generations. The results indicate that several diets are satisfactory for culturing Ceriodaphnia dubia and that the results of the toxicity tests are comparable.

Keywords: *Toxicity, *Diets, *Daphnia, *Water pollution, Waterfleas, In vitro analysis, Acute exposure, Industrial water, Sewage treatment effluents, Waste water, Cultures(Biology), Yeasts, Algae, Metals, Ammonia, Pesticides, Aquatic animals, Aquatic biology, Organophosphates, Reprint, *YCT(Yeast-Cerephyl-Trout), Selenastrum capricornutum, TIEs(Toxicity identification evaluations), Ceriodaphnia dubia.

PB94-163656/REB PC **A02**/MF **A01**
Development and Evaluation of Test Methods for Benthic Invertebrates and Sediments: Effects of Flow Rate and Feeding on Water Quality and Exposure Conditions. Journal article.
Environmental Research Lab.-Duluth, MN.
G. T. Ankley, D. A. Benoit, R. A. Hoke, E. N. Leonard, and C. W. West. 1993, 10p EPA/600/J-94/186
Pub. in Archives of Environmental Contamination and Toxicology, v25 p12-19 1993. Prepared in cooperation with AScI Corp., Duluth, MN.

In order to ensure among-laboratory comparability in the results of sediment toxicity tests, it is necessary to characterize the influence of variations in test regimes

on organism responses and exposure conditions. The objective of these studies was to develop and document an optimized combination of overlying water renewal (flow) and feeding rates for sediment tests with three commonly used benthic species (midges, Chironomus tentans; amphipods, Hyalella azteca; oligochaetes, Lumbriculus variegatus). Optimal conditions were defined by a number of chemical and biological consideration. Laboratory toxicity tests with benthic organisms and solid phase sediments are routinely used to assess the potential ecosystem impacts of sediment-associated contaminants. (Copyright (c) 1993 Springer-Verlag New York Inc.)

Keywords: *Invertebrates, *Sediments, *Toxicity, *Aquatic ecosystems, *Water pollution effects, Test methods, Exposure, Flow rate, Response, Feeding(Supplying), Water flow, Survival, Growth, Dissolved oxygen, Concentration(Composition), Ammonia, Metals, Pesticides, Bioassay, Diptera, Evaluation, Reprint, Pore water, Dieldrin, Amphiphoda.

PB94-163664/REB PC A02/MF A01
Structure-Toxicity Relationships for alpha, beta-Unsaturated Alcohols in Fish. Journal article.
Environmental Research Lab.-Duluth, MN.
O. M. Mckenyan, G. D. Veith, S. P. Bradbury, and C. L. Russom. c1993, 6p EPA/600/J-94/187
Pub. in Quant. Struct.-Act. Relat. v12 p132-136 1993. Prepared in cooperation with Wisconsin Univ.-Superior. Lake Superior Research Inst.

Previous toxicity testing with fathead minnows (Pimephales promelas) indicated that some unsaturated acetylenic and allylic alcohols can be metabolically activated, via alcohol dehydrogenase, to highly toxic alpha, Beta-unsaturated aldehydes and ketones or allene derivatives. Although several in vivo and in vitro toxicological and biochemical endpoints can differentiate these alcohols by toxic mechanism, the use of stereoelectronic molecular descriptors to discriminate these toxicants, and subsequently to predict potency, has not been previously attempted. Exploration of several descriptors indicated that soft electrophilic characteristics of acetylenic or allylic moieties in the suspected metabolites unambiguously discriminated reactive and narcotic toxicants. (Copyright (c) 1993 VCH Verlagsgesellschaft.)

Keywords: *Fishes, *Toxicity tests, *Chemical reactions, *Biochemistry, *Alcohols, Unsaturated hydrocarbons, Metabolism, Molecular structure, In vivo analysis, In vitro analysis, Carbonyl, Acetylene, Response, Animal behavior, Toxic tolerances, Reprint, *Pimephales promelas, *Properglic alcohols, Fathead minnows, Electrophiles.

PB94-163672/REB PC A03/MF A01
Toxicokinetics and Metabolism of Aniline and 4-Chloroaniline in Medaka ('Oryzias latipes'). Journal article.
Environmental Research Lab.-Duluth, MN.
S. P. Bradbury, J. M. Dady, P. N. Fitzsimmons, M. M. Voit, and D. E. Hammermeister. c1993, 12p EPA/600/J-94/188
Pub. in Toxicology and Applied Pharmacology, v118 p205-214 1993. Prepared in cooperation with Wisconsin Univ.-Superior. Lake Superior Research Inst. and ASci Corp., Duluth, MN.

The in vivo toxicokinetics and in vitro hepatic microsomal metabolism of ((14)C)4-chloroaniline in medaka (Oryzias latipes) were investigated to provide a basis upon which to interpret the toxicological responses of small aquarium fish to aniline derivatives. During static aqueous exposures of up to 320 min, parent equivalents failed to reach steady state and results from depuration studies clearly demonstrated biphasic elimination. The toxicokinetics and in vivo metabolism of both aniline and 4-chloroaniline were best described by a two-compartment model that was consistent with the assumption that metabolites of the parent amines were accumulating in the fish. (Copyright (c) 1993 Academic Press, Inc.)

Keywords: *Anilines, *Metabolism, *Fishes, *Toxicity, *Models, In vitro analysis, In vivo analysis, Water pollution effects(Animals), Biotransformation, Liver microsomes, Dose-response relationships, Environmental monitoring, Chronic exposure, Primary amines, Nitrogen, Acetylation, Enzymes, Hydroxylation, Oxidation, Reprint, *4-Chloroaniline, *Medaka, *Oryzias latipes, BCF(Bioconcentration factor), 2-Compartment model, Toxicokinetics.

PB94-163680/REB PC A03/MF A01
Uptake of Planar Polychlorinated Biphenyls and 2,3,7,8-Substituted Polychlorinated Dibenzofurans and Dibenzo-p-dioxins by Birds Nesting in the Lower Fox River and Green Bay, Wisconsin, USA. Journal article.
Environmental Research Lab.-Duluth, MN.
G. T. Ankley, G. J. Niemi, K. B. Lodge, H. J. Harris, and D. L. Beaver. c1993, 15p EPA/600/J-94/189
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Pub. in Archives of Environmental Contamination and Toxicology, v24 p332-344 1993. Prepared in cooperation with Minnesota Univ.-Duluth. Natural Resources Research Inst., Wisconsin Univ.-Green Bay. Inst. for Land and Water Studies., Michigan State Univ., East Lansing. Dept. of Zoology., and National Fisheries Contaminant Research Center, Columbia, MO.

The uptake of persistent polychlorinated hydrocarbons (PCHs) by four avian species was investigated at upper trophic levels of two aquatic food chains of the lower Fox River and Green Bay, Wisconsin. Accumulation to total and specific planar polychlorinated biphenyls (PCBs), polychlorinated dibenzofurans (PCDFs), polychlorinated dibenzo-p-dioxin (PCDDs), and H4IIE rat hepatoma cell bioassay-derived 2,37,8-tetrachlorodibenzo-p-dioxin equivalents (TCDD-EQ) was evaluated in Forster's tern (Sterna forsteri) and common tern (Sterna hirundo) chicks, and in tree swallow (Tachycineta bicolor) and red-winged blackbird (Agelaius phoeniceus) nestlings from colonies nesting in several locations within the watershed. Concentrations of the PCHs were greatest in eggs and chicks of the two tern species, less in the tree swallows and least in the red-winged blackbirds.

Keywords: *Birds, *Chlorinated hydrocarbons, *Aquatic ecosystems, *Water pollution effects, Food chains, Polychlorinated biphenyls, Herbicides, Biologicalaccumulaiton, Exposure, Concentration(Composition), Eggs, Watersheds, Bioassay, Age, Species diversity, Risk assessment, Reprint, *Waterfowl, Dioxin/Tetrachloro-dibenzo, Sterna hirundo, Fosters terns.

PB94-163698/REB PC A03/MF A01
Reponses of Juvenile Largemouth Bass to Different pH and Aluminum Levels at Overwintering Temperatures: Effects on Gill Morphology, Electrolyte Balance, Scale Calcium, Liver Glycogen, and Depot Fat. Journal article.
Environmental Research Lab.-Duluth, MN.
R. L. Leino, and J. H. McCormick. c16 Sep 92, 15p EPA/600/J-94/190
Pub. in Canadian Jnl. of Zoology, v71 p531-543 1993. Prepared in cooperation with Minnesota Univ.-Duluth. Dept. of Anatomy and Cell Biology.

Young-of-the-year largemouth bass were exposed to simulated overwintering conditions, 4 C for 113 days, in soft water. In some treatments pH was reduced to 5.0 and 4.5, with no added Al; in others, a monomeric Al level of 30 micrograms/L was maintained. In the neutral pH treatments the bass had greatly thickened gill respiratory epithelium and large numbers of chloride cells (compared with bass kept at 20 C in a prior experiment), and blood osmolalities declined and stabilized at about 260 mosmol/kg. In the acid treatments the bass had thickened respiratory lamellae and chloride cell numbers similar to those found in the neutral pH treatments. In very soft water, mean blood osmolalities declined to 242 and 219 mosmol/kg at pH 5.0 and 4.5, respectively, and did not stabilize. In the acid + Al treatments, respiratory lamellae were frequently obliterated by hyperplasia of the inter-lamellar epithelium, suggesting markedly compromised respiratory ability. In addition, chloride cell numbers were usually depressed, and those cells that were present were often vacuolated or covered by layers of pavement epithelium; blood osmolalities declined to the lethal and near-lethal level of about 200 mosmol/kg, and heavy mortalities occurred. The authors suggest that overwintering, with only moderate elevation of acid and Al levels, may represent an important critical period for survival to young-of-the-year fish in northern climates, principally by adversely affecting electrolyte balance. The gills of juvenile largemouth bass undergo marked structural changes with prolonged exposure to cold water, possibly to retard electrolyte losses.

Keywords: *Aluminum, *Water pollution effects(Animals), *Gills, *Calcium, *Liver glycogen, *Adipose tissue, *Electrolytes, Cold, Seasons, Electron microscopy, Pathology, Osmolar concentration, pH, Blood, Reprint, *Largemouth bass.

PB94-163706/REB PC A03/MF A01
Field and Laboratory Investigation of Acid Effects on Largemouth Bass, Rock Bass, Black Crappie, and Yellow Perch. Journal article.
Environmental Research Lab.-Duluth, MN.
J. G. Eaton, W. A. Swenson, J. H. McCormick, T. D. Simonson, and K. M. Jensen. c1992, 17p EPA/600/J-94/191
Pub. in Transactions of the American Fisheries Society, v121 p644-658 1992. Prepared in cooperation with Wisconsin Univ.-Superior. Lake Superior Research Inst. and Wisconsin Dept. of Natural Resources, Monona.

One-half of Little Rock Lake, a small seepage lake in north-central Wisconsin, was gradually acidified by additions of sulfuric acid between August 1983 and November 1990. The ambient pH (6.1) of the lake was reduced at successive 2-year intervals to pH 5.6, 5.1, and 4.7. Responses of largemouth bass Micropterus salmoides, rock bass Ambloplites rupestris, black crappie Pomoxis nigromaculatus, and yellow perch Perca flavescens populations to the pH reductions were recorded and compared to the responses of these species during in situ bioassays and laboratory toxicity tests on embryos and larvae. Laboratory results obtained for largemouth bass and rock bass underestimated, black crappie results overestimated, and yellow perch results were similar to effects observed in field studies. In situ bioassays predicted field responses better than did laboratory toxicity tests. Laboratory results showed that monomeric Al concentrations of approximately 50 microgram/l, which were comparable to Al concentrations in the acidified half of the lake, altered low-pH toxicity. Reduced recruitment was observed in field populations at higher pH than that at which adult mortality was observed. The results indicate that laboratory toxicity tests with early life stages may not accurately predict field population responses and that results from laboratory tests should be field-validated whenever possible.

Keywords: *Acidification, *Little Rock Lake, *Fresh water fishes, *Water pollution effects, Toxicity, Seepage, Sulfuric acid, Bass, Perch, pH, Response, Populations, Field tests, Bioassay, Embryos, Laboratories, Aluminum, Concentration(Composition), Comparison, Graphs(Charts), Reprint, *North Central Region(Wisconsin), Micropterus salmoides.

PB94-163722/REB PC A02/MF A01
pH-Dependent Toxicity of Cd, Cu, Ni, Pb and Zn to 'Ceriodaphnia dubia', 'Pimephales promelas', 'Hyalella azteca' and 'Lumbriculus variegatus'. Journal article.
Environmental Research Lab.-Duluth, MN.
M. K. Schubauer-Berigan, J. R. Dierkes, P. D. Monson, and G. T. Ankley. c1993, 9p EPA/600/J-94/193
Pub. in Jnl. of Environmental Toxicology and Chemistry, v12 p1261-1266 1993. Prepared in cooperation with ASci Corp., Duluth, MN.

The speciation and bioavailability of metals are known to be affected by pH. Although many studies have focused on effects on metals of pH changes resulting from lake acidification (i.e., pH change 7 to 4), metal toxicity changes at higher pH values (i.e., pH 6-9) are of great interest to those performing effluent and sediment toxicity testing and toxicity identification evaluations (TIEs). In addition, most previous studies have addressed metal toxicity changes with pH to water-column organisms rather than to benthic or epibenthic species. The authors tested the acute toxicity of five metals (Cd, Cu, Ni, Pb, and Zn) to Ceriodaphnia dubia, Pimephales promelas, Hyalella azteca, and Lumbriculus variegatus at three pH values (6.3, 7.3, and 8.3) in very hard reconstituted water (hardness 300-320 mg/l as CaCO3). Toxicity of Cd, Ni, and Zn was greatest at pH 8.3 and least at pH 6.3 to most of these species. Conversely, the toxicity of Cu and Pb was greatest at pH 6.3 and least at pH 8.3 to most of the species.

Keywords: *Toxic tolerances, *Metals, *pH, *Fishes, *Aqueous solutions, Changes, Acidification, Calcium carbonates, Toxic tests, Cadmium, Nickle, Zinc, Copper, Lead(Metal), Species diversity, Toxicity tests, Organisms, Trace elements, Reprint, Ceriodaphnia dubia, Pimephales promelas, Hyalella azteca.

PB94-163730/REB PC A02/MF A01
Environmental Research Lab.-Duluth, MN.

2,3,7,8,-Tetrachlorodibenzo-p-dioxin Equivalents in Tissues of Birds at Green Bay, Wisconsin, USA. Journal article.
Michigan State Univ., East Lansing.
P. D. Jones, J. P. Giesy, J. L. Newsted, D. A. Verbrugge, and D. L. Beaver. c1993, 12p EPA/600/J-94/194
Grant EPA-R-815830-01-0
Pub. in Archives of Environmental Contamination and Toxicology, v24 p345-354 1993. Prepared in cooperation with National Fisheries Contaminant Research Center, Columbia, MO. and Minnesota Univ.-Duluth. Natural Resources Research Inst. Sponsored by Environmental Research Lab.-Duluth, MN.

The environment has become contaminated with complex mixtures of planar, chlorinated hydrocarbons (PCHs) such as polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs) and structurally similar compounds. Because the potencies of individual congeners to cause the same adverse effects vary greatly and the relative as well as absolute concentrations of individual PCH vary among samples from different locations, it is difficult to assess the toxic effects of these mixtures on wildlife. These compounds can cause a number of adverse effects, however, because the toxic effects which occur at ecologically-relevant concentrations such as embryo-lethality and birth defects appear to be mediated through the same mechanism.

Keywords: *Birds, *Toxicity, *Water pollution effects, Chlorinated hydrocarbons, Polychlorinated biphenyls, Furans, Bioassay, Tissues(Biology), Concentration(Composition), Embryos, Chemical analysis, Quality assurance, Tables(Data), Reprint, *Green Bay(Wisconsin), Waterfowl, Furans/polychlorinated dibenzo, Dioxins.

PB94-163748/REB PC **A02/MF A01**
Comparison of the Pulmonary Defenses against Streptococcal Infection in Rats and Mice Following 03 Exposure: Differences in Disease Susceptability and Neutrophil Recruitment. Journal article.
North Carolina Univ. at Chapel Hill. Center for Environmental Medicine and Lung Biology.
M. I. Gilmour, and M. K. Selgrade. c1993, 10p EPA/600/J-94/195
Grant EPA-R-817643
Pub. in Toxicology and Applied Pharmacology, v123 p211-218 1993. Prepared in cooperation with Health Effects Research Lab., Research Triangle Park, NC. Immunotoxicology Branch.

To investigate the mechanism of disease protection in rats, antibacterial defenses of two strains of mice and F344 rats were compared. O3 exposure (3 hr, 0.4 or 0.8 ppm) and infection with S. zooepidemicus resulted in a dose-dependent proliferation of bacteria in the lungs of mice and high mortality. Polymorphonuclear leukocytes (PMNs) were observed in severely affected individuals 2 or more days postinfection and did not alter the fatal infection. In contrast, microbial inactivation was only impaired in O3-exposed rat lungs during the first 48 hr after infection. In these animals PMNs could be isolated from bronchoalveolar lavage fluid between 6 and 48 hr postinfection with the peak response occurring at 24 hr. Pretreatment with anti-PMN serum eliminated the neutrophil influx and impaired further the bactericidal activity in ozone-exposed rats. The results suggest that inhaled streptococci are cleared normally from the mouse lung by AMs. Following exposure to O3, AM phagocytosis is reduced and the mice develop a fatal infection. Differences in antimicrobial defenses between various experimental species and humans need to be better understood in order to predict effects of air pollutants on susceptibility to infection in man.

Keywords: *Streptococcal infections, *Air pollution effects(Animals), *Disease susceptibility, *Neutrophils, *Ozone, *Lung, Comparison, Rats, Mice, Toxicity, Immunity, Species diversity, Phagocytosis, Alveolar macrophages, Reprint, Streptococcus zooepidemicus.

PB94-163755/REB PC **A02/MF A01**
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
Dose-Response Relationships in Mice Following Subchronic Exposure to 2,3,7,8-Tetrachlorodibenzo-p-dioxin: CYP1A1, CYP1A2, Estrogen Receptor, and Protein Tyrosine Phosphorylation. Journal article.
North Carolina Univ. at Chapel Hill. Center for Environmental Medicine and Lung Biology.
M. J. DeVito, X. Ma, J. G. Babish, M. Menache, and L. S. Birnbaum. c1994, 10p EPA/600/J-94/196
Grants EPA-R-817643, EPA-R-813113
Pub. in Toxicology and Applied Pharmacology v124 n1 p82-90 Jan 94. Prepared in cooperation with Paracelsian, Inc., Ithaca, NY. Cellular Physiology Section., New York State Coll. of Veterinary Medicine, Ithaca., and Duke Univ. Medical Center, Durham, NC. Center for Extrapolation Modelling. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.

The dose-response relationships for different endpoints in different tissues were compared in response to 2,3,7,8-tetrachlorodibenzodioxin (TCDD) treatment. TCDD was administered 5 days/week for 13 weeks at doses ranging from 1.5 - 150 ng/kg/day to female B6C3F1 mice. Ethoxyresorufin-O-deethylase (EROD) activity was increased in liver, lung and skin at doses as low as 1.5 ng/kg/day. EROD activity did not attain maximal induction. Liver acetanilide-4-hydroxylase activity was induced at doses as low as 1.5 ng/kg/d and reached maximal induction at 45 ng/kg/d. TCDD treatment significantly increased the amount of three phosphotyrosyl proteins in liver S-20 fractions. Changes in phosphotyrosyl proteins reached maximal induction at 4.5 ng/kg/d. Hepatic and uterine estrogen receptor levels were unchanged at any of the doses tested. These data indicate that TCDD produces multiple effects with multiple dose-response curves suggesting that there are events in addition to receptor binding that are endpoint-specific, leading to different dose-response relationships.

Keywords: *Tetrachlorodibenzodioxin, *Toxicity, *Cytochrome P-450, *Estrogen receptors, *Tyrosine, Dose-response relationships, Phosphorylation, Liver, Lung, Skin(Anatomy), Reprint.

PB94-163763/REB PC **A01/MF A01**
Duke Univ. Medical Center, Durham, NC. Dept. of Pharmacology.
Prenatal Cocaine Eliminates the Sex-Dependent Differences in Activation Observed in Adult Rats After Cocaine Challenge. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
D. B. Miller, and F. J. Seidler. c30 Jun 93, 5p EPA/600/J-94/197
Pub. in Brain Research Bulletin, v33 n2 p179-182 Jan 94. Sponsored by Duke Univ. Medical Center, Durham, NC. Dept. of Pharmacology.

In the adult rat, acute administration of cocaine results in enhanced expression of certain behaviors. This activation is often referred to as stereotypy becauseof its repetitive nature. Repeated exposure to the same dose of cocaine does not result in tolerance or a diminution of these behavioral responses. Rather, an increased responsiveness to cocaine, termed sensitization, is observed. Female rats, in comparison to male rats, display greater activation to a given dose of cocaine and greater sensitization with repeated exposure. As prenatal cocaine exposure can involve repeated exposure to the drug, the authors examined the behavioral activation induced by an acute dose of cocaine. Young adult rats of both sexes received a challenge dose of cocaine to determine the long-term effects of repeated in utero exposure to cocaine (30 mg/kg daily, SC) given between gestational days 8-20. As expected, female offspring of dams exposed to saline in utero displayed greater activation of a 20 mg/kg SC dosage of cocaine than their male counterparts. However, these sex differences were completely eliminated by prenatal exposure to cocaine. That is, female rats receiving cocaine during the prenatal period showed no more activation to an acute dose of cocaine as young adults than either control males or those males receiving cocaine in utero. Males exposed in utero to cocaine showed activation to cocaine challenge equivalent to that displayed by males exposed yo saline in utero. Prenatal exposure to cocaine may alter sexual differentiation of the brain.

Keywords: *Cocaine, *Stereotyped behavior, *Animal behavior, *Fetus, *Prenatal behavior delayed effects, *Sex factors, Rats, Locomotion, Tolerances(Physiology), Reprint.

PB94-163771/REB PC **A03/MF A01**
Transcriptional Changes in Hepatic Tumors of Rats Induced by Di(2-ethylhexyl) phthalate and Di-n-Octyl phthalate. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
J. C. Kandala, A. B. DeAngelo, T. V. Reddy, F. B. Daniel, and R. V. Guntaka. c1993, 15p EPA/600/J-94/198
Pub. in Jnl. of Environmental Science v2 n3 p147-159 Jul 93. Prepared in cooperation with Missouri Univ.-Columbia.

Di(2-ethylhexyl) phthalate (DEHP) and di-n-octyl phthalate (DOP) are nongenotoxic carcinogens found in drinking water, which induce mainly liver tumors. The mechanism of tumorigenesis by these chemicals remains to be elucidated. The present study was undertaken to test whether any known oncogenes are activated in DEHP- and DOP-induced tumors. The authors examined tumor and chemically treated rat liver RNAs for elevated expression of 10 different oncogenes: c-myc, c-fos, c-Ha-ras, c-Ki-ras, c-raf-l, c-jun, erbA, v-bas, v-sis and v-src. As controls, they used tissue-specific genes such as albumin, cytochrome P450, aldehyde dehydrogenase, and ornithine decarboxylase. Their results indicated that the expression pattern of oncogenes and other genes in chemically treated livers or tumors was not greatly different from that of controls, although in individual livers, multiple changes in transcription were detected. Recently, the authors isolated two genes from a hepatoma cell line by subtraction hybridization.

Keywords: *Experimental liver neoplasms, *Genetic transcription, *Toxicity, *Diethylhexyl phthalate, Oncogenes, Ribonucleic acids, Gene expression, Nucleic acid hybridization, Albumins, Cytochrome P-450, Aldehyde dehydrogenase, Ornithine decarboxylase, Reprint, *Di-n-octyl phthalate.

PB94-163789/REB PC **A02/MF A01**
Lowering pH Increases Embryonic Sensitivity to Formate in Whole Embryo Culture. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
J. E. Andrews, M. Ebron-McCoy, R. J. Kavlock, and J. M. Rogers. 1993, 8p EPA/600/J-94/199
Pub.in Toxicology In vitro, v7 n6 p757-762 Nov 93.

The effects of formate exposure on mammalian embryo development were investigated using the rat whole embryo culture system as a model. Day 9.5 (presomite) rat embryos were explanted and cultured for 48 hr in rotating bottles containing rat serum with 0, 0.2, 0.4, 0.8, 1.2 or 1.6 mg sodium formate/ml culture medium at pH 8.13, 7.75, 7.00, 6.50 or 6.00 to determine whether the pH of the culture medium affects the in vitro developmental toxicity of formate. Exposure to 1.6 mg formate/ml affected protein concentration, somite number (SN), head length (HL), developmental score (DS), crown-rump length (CRL) and yolk-sac diameter of embryos at all pH levels. Formate became more toxic with decreasing pH of the culture media. There was an apparent pH-dependent increase in embryolethality at 1.6 mg formate/ml and 100% lethality at pH 6.00. The 1.2-mg/ml formate concentration affected DS, CR, HL and protein content at pH levels of 7.00 and lower. At pH 6.5 embryos, that were not exposed to formate were not significantly different from the other control groups except in reduced CR but at this pH, all exposure levels of formate resulted in microcephaly and reduction in embryonic protein as well as reduced CR.

Keywords: *pH, *Embryos, *Formic acids, *Embryo development, *Teratogenic compounds, Cultures(Biology), Rats, Culture media, Dose-response relationships, Toxicity, In vitro analysis, Acidosis, Models, Reprints, WEC(Whole embryo culture).

PB94-163797/REB PC **A02/MF A01**
Aluminum Alters Calcium Transport in Plasma Membrane and Endoplasmic Reticulum from Rat Brain. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
W. R. Mundy, P. R. S. Kodavanti, V. F. Dulchinos, and H. A. Tilson. c1994, 8p EPA/600/J-94/200
Pub. in Jnl. of Biochemical Toxicology, v9 n1 p17-23 Feb 94.

Calcium is actively transported into intracellular organelles and out of the cytoplasm by Ca(2+)/Mg(2+)-ATPases located in the endoplasmic reticulum and plasma membranes. The authors studied the effects of aluminum on calcium transport in the adult rat brain. They examined (45)Ca-uptake in microsomes and Ca(2+)-ATPase activity in microsomes and synaptosomes isolated from the frontal cortex and cerebellum of adult male Long-Evans rats. ATP-dependent (45)Ca-uptake was similar in microsomes from both brain regions. The addition of 50-800 microM AlCl3 resulted in a concentration-dependent inhibition of (45)Ca-uptake. Mg(2+)-dependent Ca(2+)-ATPase activity was significantly lower in synaptosomes compared to microsomes in both frontal cortex and cerebellum. In contrast to the uptake studies, AlCl3 stimulated Mg(2+)-dependent Ca(2+)-ATPase activity in both microsomes and synaptosomes from both brain regions. To determine the relationship between aluminum and Mg(2+), the authors measured ATPase activity in the presence of increasing concentrations of Mg(2+) or AlCl3. Maximal ATPase activity was obtained between 3 and 6 mM Mg(2+). (Copyright (c) 1994 VCH Publishers, Inc.)

Keywords: *Aluminum, *Calcium, *Biological transport, *Brain, *Endoplasmic reticulum, *Toxicity, Reprint, Ca(2+) Mg(2+)-ATPase, Rats, Microsomes, Synaptosomes, Homeostasis, Signal transduction, Cell membrane.

PB94-163805/REB PC A02/MF A01
Aluminum Decreases Muscarinic, Adrenergic and Metabotropic Receptor-Stimulated Phosphoinositide Hydrolysis in Hippocampal and Cortical Slices from Rat Brain. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
T. J. Shafer, W. R. Mundy, and H. A. Tilson. 1993, 10p EPA/600/J-94/201
Pub. in Brain Research v629 n1 p133-140, 26 Nov 93.

Effects of aluminum chloride (AlCl3) (0.1 to 1000 microM) on inositol phosphate (IP) accumulation stimulated by carbachol (CARB), norepinephrine (NE) or quisqualate (QUIS) were examined in rat hippocampal and cortical slices. In the absence of agonist, only 1000 micro M AlCl3 significantly reduced basal accumulation of IPs. For CARB-stimulated IP accumulation, 100 microM and greater AlCl3 significantly inhibited IP accumulation. In cortical slices, 1000 microM AlCl3 reduced CARB-stimulated IP accumulation by 55% and in hippocampal slices 1000 microM AlCl3 inhibited IP accumulation by 40%. Similar effects of AlCl3 were observed for NE-stimulated IP accumulation. In cortical slices, the concentration-response for AlCl3 effects on agonist-stimulated IP accumulation was significantly different from that in hippocampal slices. For QUIS-stimulated accumulation of IPs, 1000 microM AlCl3 significantly inhibited IP accumulation in hippocampal slices. However, in cortical slices a biphasic effect of AlCl3 was observed. 500 and 1000 microM AlCl3 significantly inhibited IP accumulation, whereas 10 and 50 microM AlCl3 significantly enhanced QUIS-stimulated IP accumulation. In both hippocampal and cortical slices, 500 microM AlCl3 significantly inhibited CARB-, NE- or QUIS-stimulated IP accumulation at all agonist concentrations (0.1 to 1000 microM) tested, indicating a post-receptor effect on agonist-mediated IP accumulation. To determine the influence of the form of aluminum salt on IP accumulation, the effects of equimolar concentrations of AlCl3, aluminum citrate (Al(Cit)), and aluminum lactate (Al(Lac)) on CARB-stimulated IP accumulation were determined. Results suggest that: (1) AlCl3 disrupts IP accumulation mediated by different pharmacological classes of receptors; (2) differences in sensitivity to AlCl3 exist in the hippocampus and cortex; (3) AlCl3 and Al(4)F(-1)influence IP accumulation through separate mechanisms and Al(4)F(-1) is not responsible for effects of AlCl3 on receptor-stimulated IP accumulation; (4) AlCl3 appears to exert its action on IP accumulation 'downstream' of the receptor and receptor-G-protein interaction; and (5) Effects of aluminum on IP accumulation are dependent upon the aluminum salts used.

Keywords: *Aluminum, *Toxicity, *Hippocampus, *Cerebral cortex, *Endogenous substance receptors, *Phosphatidylinositols, Hydrolysis, Adrenergic receptors, Muscarinic receptors, Carbachol, Norepinephrine, GTP-binding proteins, Alpha-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid, Tissue distribution, Binding sites, Dose-response relationships, Reprint.

PB94-163813/REB PC A03/MF A01
Within-Session Changes in Peak N160 Amplitude of Flash Evoked Potentials in Rats(I,2). Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
D. W. Herr, D. King, V. T. Griffin, W. P. Watkinson, and W. K. Boyes. c1993, 19p EPA/600/J-94/202
Pub. in Jnl.of Physiology and Behavior, v55 n1 p83-89 Jan 94. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle.

The negative peak occurring approximately 160 ms after stimulation (peak N(160)) of flash evoked potentials (FEPs) of rats changes with repeated testing. Habituation, sensitization, and arousal have all been invoked to explain these changes, but few studies have directly tested these explanations. The authors examined within-session changes in peak N(160) amplitutde with repeated testing, and the modulatory effects of stimulus intensity and auditory white noise. Peak N(160) amplitude underwent within-session increases on early days and within-session decreases on later days. The within-session changes were not affected by stimulus intensity. The data suggest that the within-session changes in peak N(160) amplitude may reflect a habituation-like response to the test environment. (Copyright (c) 1993 Pergamon Press Ltd.)

Keywords: *Animal physiology, *Amplitude modulation, *White noise, Habituation(Learning), Conditioned stimulus, Neurology, Responses, Arousal, Pseudoconditioning, Physiological effects, Biomedical measurement, Electroencephalography, Statistical analysis, Heart rate, Rats, Reprint, *FEPs(Flash evoked potentials), *Peak N(160).

PB94-163821/REB PC A02/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Human Studies Div.
Short Communication: Suggestions for Collection and Reporting of Chemosensory (olfactory) Event-Related Potentials. Journal article.
California Coll. of Medicine, Irvine.
W. J. Evans, G. Kobal, T. S. Lorig, and J. D. Prah. c1993, 8p EPA/600/J-94/203
Pub in Chemical Senses, V18 n6 p751-756 1993. Prepared in cooperation with Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). and Washington and Lee Univ., Lexington, VA. Dept. of Psychology. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Human Studies Div.

Chemosensory event-related potentials hold great promise for furthering the understanding of the olfactory system, the processing of olfactory information, and disease processes affecting olfaction. Collection of this type of data has been difficult and suggestions are presented to aid investigators new to this field. Suggestions for nomenclature, recording parameters, chemosensory stimulation parameters and reporting conventions are discussed. Also discussed are the future directions of this field and the current needs regarding the development of a normative database. (Copyright (c) Oxford University Press 1993.)

Keywords: *Smell, *Electrophysiologic recording, *Evoked potentials, *Guidelines, Chemoreceptors, Measuring instruments, Data collection, Reporting, Data bases, Stimulus(Psychophysiology), Psychometrics, Reliability, Replicating, Trends, Research, Requirements, Reprint, *CSERPs(Chemosensory event-related potentials), *Electro-olfactogram, *Trigeminal methods development.

PB94-163839/REB PC A03/MF A01
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
Analyses of Cytogenetic Damage in Rodents Following Exposure to Simulated Groundwater Contaminated with Pesticides and a Fertilizer. Journal article.
National Inst. of Environmental Health Sciences, Research Triangle Park, NC.
A. D. Kligerman, R. E. Chapin, G. L. Erexson, D. R. Germolec, and P. Kwanyuen. c1993, 12p EPA/600/J-94/204
Contract EPA-68-02-4456
Pub. in Mutation Research v300 n2 p125-134 Jul 93. Prepared in cooperation with Environmental Health Research and Testing, Inc., Research Triangle Park, NC. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.

Male Fischer 344 rats and female B6C3F1 mice were each exposed through their drinking water to a mixture of pesticides and ammonium nitrate that simulated contaminated groundwater in California (California Chemical Mixture (CCM)). Exposures were for 71 or 91 days, respectively. In addition, B6C3F1 female mice were exposed for 91 days to another pesticide and ammonium nitrate mixture (Iowa Chemical Mixture (ICM)) through their drinking water. The spleens were removed from the animals, and the splenocytes were cultured for analyses of sister-chromatid exchange (SCE), chromosome aberrations (CA), and micronucleic (MN) in cytochalasin B-induced binucleate cells. A concentration-related increase in SCEs was found in the splenocytes of the rat at the 1 x, 10 x and 100 x levels of the CCM and at the 100 x concentration of the CCM in the mouse. (Copyright (c) 1993 Elsevier Science Publishers B.V.)

Keywords: *Chromosome aberrations, *Pesticides, *Groundwater, *Water pollution effects(Animals), Herbicides, Fertilizers, Toxicity, Ammonium nitrates, Sister chromatid exchange, Rats, Mice, Mutagens, California, Iowa, Reprint, *Genotoxicity.

PB94-163847/REB PC A02/MF A01
Mutagenicity and Chemical Analysis of Emissions for the Open Burning of Scrap Rubber Tires. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
D. M. DeMarini, P. M. Lemieux, J. V. Ryan, L. R. Brooks, and R. W. Williams. c1994, 8p EPA/600/J-94/205
Pub. in Environmental Science and Technology v28 n4 p136-141 Jan 94. Prepared in cooperation with Acurex Environmental Corp., Research Triangle Park, NC. and Environmental Health Research and Testing, Inc., Research Triangle Park, NC.

The Salmonella mutagenicity assay and chemical analyses were used to evaluate the emissions from the open burning of scrap rubber tires that had been cut into either of two sizes, CHUNK or SHRED. A wide variety of Polycyclic aromatic hydrocarbons (PAHs) was detected in the particulate organics. The mutagenic emission factor for the open burning of scrap rubber tires (approximately 8 x 10 to the 7th power revertants/kg of tire burned) was 3-4 orders of magnitude greater than the values for the combustion of oil, coal, or wood in utility boilers; it was most similar to values for the open burning of wood or plastic. These results demonstrate for the first time that the open burning of scrap rubber tires produces a high mutagenic emission factor, posing potential environmental and health effects. (Copyright (c) 1993 American Chemical Society.)

Keywords: *Mutagens, *Chemical analysis, *Open burning, *Tires, Air pollution effects(Humans), Toxic substances, Combustion products, Assaying, Salmonella, Pathogenic bacteria, Dose-response relationships, Particulates, Polycyclic aromatic hydrocarbons, Liquid column chromatography, Field tests, Burning rate, Sythetic elastomers, Vaporizing, Reprint, *Mutagenic emission factors, *Bioassay-directed fractionation, *HPLC(High performance liquid chromatography), *Semivolatile organics, *Dinitroarenes.

PB94-163854/REB PC A03/MF A01
Interaction of Inorganic Mercury Salts with Model and Red Cell Membranes: Importance of Lipid Binding Sites. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
M. Delnomdedieu, and J. W. Allis. 1993, 19p EPA/600/J-94/206
Pub. in Chemico-Biologic Interactions v88 n1 p71-87 Oct 93. Prepared in cooperation with French Foreign Ministry Lavoisier Program, Paris (France),.

The effect of two mercury salts, HgCl2 and Hg(NO3)2, on the thermotropic properties of phosphatidylserine (PS) model membranes and sonicated rat red cell membranes was investigated by fluorescence polarization. Both Hg(II) salts abolished the phase transition and decreased the membrane fluidity by interacting with PS. These results indicate that besides protein thiol groups, Hg(II)-lipid binding sites play an important role in the interaction of Hg(II) with red cell membranes that is qualitatively different from Hg(II) binding to protein thiol groups. (Copyright (c) 1993 Elsevier Scientific Publishers Ireland Ltd.)

Keywords: *Receptor sites(Physiology), *Lipids, *Mercury nitrates, *Mercury chlorides, *Membranes, Erythrocytes, Rats, Anisotropy, Temperature effects, Physicochemical properties, Heavy metals, Fluorescence, Concentration (Composition), pH, Models, Toxicity, Mercury inorganic compounds, Reprint, *Model membranes, PS(Phosphatidylserine).

PB94-163862/REB PC **A02/MF A01**
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
Quantification and Molecular Characterization of 'hprt' Mutants of Human T-Lymphocytes. Journal article.
Environmental Health Research and Testing, Inc., Research Triangle Park, NC.
M. M. Moore, K. Harrington-Brock, L. J. Zimmerman, L. P. Burnette, and T. W. Smith. c1993, 8p EPA/600/J-94/207
Contract EPA-68-D10148, Grant EPA-R-83565
Pub. in Environmental Health Perspectives Supplements, v101 sup3 p219-224 Dec 93. Prepared in cooperation with Vermont Univ., Burlington. Genetics Lab. Sponsored by Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.

Somatic mutations have been implicated as critical early events in carcinogenesis. Point mutations, deletions, and translocation events have been shown to activate oncogenes or inactivate suppressor oncogenes. In human population monitoring, quantitative analysis of mutation events that affect gene function is limited to those genes whose cellular phenotypes can be identified by selection procedures and to those tissues (like blood) that are accessible for analysis. In an effort to determine the frequency and types of mutations that can be detected at the hypoxanthine guanine phosphoribosyltransferase (hprt) gene, we have used the T-cell cloning assay and have developed a strategy to propagate mutants and screen for point mutations and breakage events. To date we have found presumed point mutations, intragenic deletions, and deletions that extend outside of the hprt gene. By analyzing mutations in selectable, nonessential gene markers, it should be possible to understand mechanisms of both spontaneous and induced genetic damage. An association of these specific genetic events with human diseases and the evaluation of the ability of environmental chemicals to induce these specific types of mutations will lead to a rational basis for evaluating risks from various chemical exposures.

Keywords: *T-Lymphocytes, *Point mutation, *Hypoxanthine phosphoribosyltransferase, Humans, Clone cells, Phenotype, Deoxyribonucleic acids, Polymerase chain reaction, Translocation(Genetics), Gene deletion, Reprint.

PB94-163870/REB PC **A03/MF A01**
Hazard Identification: Efficiency of Short-Term Tests in Identifying Germ Cell Mutagens and Putative Nongenotoxic Carcinogens. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
M. D. Waters, H. F. Stack, M. A. Jackson, and B. A. Bridges. c1993, 14p EPA/600/J-94/208
Pub. in Environmental Health Perspectives Supplements, v101 sup3 p61-72 Oct 93. Prepared in cooperation with Environmental Health Research and Testing, Inc., Research Triangle Park, NC. and Sussex Univ., Brighton (England). Cell Mutation Unit.

For more than a decade, mutagenicity tests have had a clearly defined role in the identification of potential human mutagens and an ancillary role in the identification of potential human carcinogens. The efficiency of short-term tests in identifying germ cell mutagens has been examined using a combined data set derived from the U.S. Environmental Protection Agency/International Agency for Research on Cancer Genetic Activity Profile (EPA/IARC GAP) and EPA Gene-Tox databases. Our review of these data indicates adequate sensitivity of batteries of in vitro short-term mutagenicity tests in identifying germ cell mutagens. The analysis also supports the inclusion of an in vivo assay as suggested in proposed regulatory testing guidelines. In the context of carcinogenicity testing, the ability of short-term bioassays to detect genotoxic or mutagenic carcinogens is well established. Such tests are not considered to be as sensitive to nongenotoxic or nonmutagenic carcinogens. However, analyses presented in the report using the EPA/IARC GAP database demonstrate that many putative nongenotoxic carcinogens that have been adequately tested in short-term genetic bioassays induce gene or chromosomal mutation or aneuploidy. Further investigation should reveal whether the mutagenicity of these agents plays an important mechanistic role in their carcinogenicity.

Keywords: *Mutagens, *Carcinogens, *Germ cells, *Toxicity, Mutagenicity tests, Carcinogenicity tests, Humans, Bioassay, Chromosome aberrations, Micronucleus test, Aneuploidy, Reprint.

PB94-163888/REB PC **A03/MF A01**
Developmental Toxicity of Inhaled Methanol in the CD-1 Mouse, with Quantitative Dose-Response Modeling for Estimation of Benchmark Doses. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
J. M. Rogers, M. L. Mole, N. Chernoff, B. D. Barbee, and C. I. Turner. c1993, 15p EPA/600/J-94/209
Pub. in Teratology, v47 n3 p175-188 Mar 93. See also PB93-106979. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC.

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. 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. Thus, the NOAEL for the developmental toxicity in this study is 1,000 ppm. The results of this 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. (Copyright (c) 1993 Wiley-Liss, Inc.)

Keywords: *Teratogenic compounds, *Methanol, *Toxicity, Dose-response relationships, Congenital abnormalities, Cleft palate, Oral administration, Blood, Reprint.

PB94-163896/REB PC **A03/MF A01**
National Institutes of Health, Bethesda, MD.
Acute and Long-Term Effects of a Single Dose of the Fungicide Carbendazim (Methyl 2-Benzimidazole Carbamate) on the Male Reproductive System in the Rat. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
M. Nakai, R. A. Hess, B. J. Moore, R. F. Guttroff, and L. F. Strader. c1992, 14p EPA/600/J-94/210
Grant NIH-ES-05214
Pub. in Jnl. of Andrology, v13 n6 p507-518 Nov/Dec 92. Prepared in cooperation with Illinois Univ. at Urbana-Champaign. Dept. of Veterinary Biosciences. and Miyazaki Univ. (Japan). Dept. of Veterinary Anatomy. Sponsored by National Institutes of Health, Bethesda, MD.

The effects of carbendazim (methyl 2-benzimidazole carbamate) on the testis, efferent ductules, and sperm were determined in the adult rate after a single oral dose. Two experimental trials were performed: a time response between 2 hours and 32 days after exposure using 0 and 400 mg/kg, and a dose response at 2 and 70 days after exposure using 0 to 800 mg/kg doses. A dose-dependent increase in testicular weight 2 days after treatment was accompanied by increases in seminiferous tubular diameter and excessive loss of immature germ cells in a stage-dependent manner. There was also a dose-dependent increased incidence of occlusions in the efferent ductules. The occluded ductules were characterized by severe inflammation and exhibited disorganization of the epithelium. At 70 days, there were dose-dependent decreases in mean testis weight and mean seminiferous tubular diameter; however, only minimal long-term effects were seen at 50 mg/kg. Results show that carbendazim produces more severe short- and long-term effects on the male reproductive system than the fungicide benomyl.

Keywords: *Reproductive system, *Toxicity, *Males, *Fungicides, Rats, Dose-response relationships, Pathology, Testis, Seminiferous tubules, Spermotozoa, Organ weight, Reprint, *Carbendazim.

PB94-163904/REB PC **A03/MF A01**
Aerodynamic Size Measurement of Airborne Fibers and Health Effects Implications. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
T. B. Martonen. 1992, 12p EPA/600/J-94/211
Pub. in Advanced Powder Technology, v3 n4 p311-321 Oct 92.

The constituent particles of many ambient and workplace aerosols of health effects concerns are of fibrous and aggregate geometric shapes. A theoretical model has been developed which predicts that natural and synthetic fibers may be preferentially deposited at lung airway bifurcations. Therefore, to assess potential exposure hazards it is necessary to have accurate kinetic classifications of airborne particulate matter. Centrifugal spectrometers can give direct and continuously graded measures of the aerodynamic size distributions of sampled aerosols. Herein, a mathematical description of centrifuge operations is refined to permit the characterization of irregularly shaped particles, with specific application to fibers. (Copyright (c) 1992 VSP and Society of Powder Technology, Japan.)

Keywords: *Fibers, *Mathematical models, *Kinetics, *Air pollution effects(Humans), Aerosols, Centrifuges, Spectrometers, Aerodynamic characteristics, Particle size distribution, Particle shape, Risk assessment, Deposition, Respiratory diseases, Industrial hygiene, Asbestos, Occupational exposure, Performance evaluation, Ceramic fibers, Glass fibers, Reprint, *Inhaled particles, *PBPK modeling.

PB94-163912/REB PC **A02/MF A01**
Quantitative and Temporal Relationships between DNA Adduct Formation in Target and Surrogate Tissues: Implications for Biomonitoring. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
S. Nesnow, J. Ross, G. Nelson, K. Holden, and G. Erexson. c1993, 8p EPA/600/J-94/212
Pub. in Environmental Health Perspectives Supplements, V101 sup3 p37-42 1993. Prepared in cooperation with Environmental Health Research and Testing, Inc., Research Triangle Park, NC. and Kentucky Univ., Lexington. Dept. of Preventive Medicine and Environmental Health.

DNA-carcinogen adducts offer a potential dosimeter for environmental genotoxicants reaching the exposed individual. Because the target tissues for many chemical carcinogens are not readily accessible for monitoring adducts in humans, peripheral blood lymphocytes (PBLs) have served as surrogate sources of exposed DNA. Both benzo(a)pyrene (B(a)P) and benzo(b)fluoranthene (B(b)F) are widely distributed in the environment as components of complex mixtures, such as automobile exhaust, cigarette smoke, foods, water, and urban air. Thus, human exposure to these chemicals is widespread, and they probably contribute to overall human lung cancer risk. The interpretation of the results of such studies would be enhanced by an understanding of the pharmacokinetics of specific DNA adduct formation and persistence in both target and surrogate tissues.

Keywords: *DNA adducts, *Environmental carcinogens, Time factors, Lung, Liver, Benzo(a)pyrene, Lymphocytes, Humans, Reprint, *Biological monitoring, Benzo(b)fluoranthene.

PB94-163920/REB PC **A03/MF A01**
Fiber Deposition Along Airway Walls: Effects of Fiber Cross-Section on Rotational Interception. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
D. L. Johnson, and T. B. Martonen. c1993, 14p EPA/600/J-94/213
Pub. in Jnl. Aerosol Science, v24 n4 p525-536 Oct 93. Prepared in cooperation with Oklahoma Univ. Health Sciences Center, Oklahoma City. Dept. of Occupational and Environmental Health.

Jeffery's equations of motion for ellipsoidal bodies in shear flow are applied to triaxial ellipsoids using numerical integration and modeling. The rotational behaviors of prolate triaxial ellipsoids are compared with ellipsoids of revolution, and the resultant motions are demonstrated to differ significantly. The effects of initial orientations on inhaled fiber motion in human airways are examined, and deposition efficiencies along airway walls are computed. (Copyright (c) 1993 Pergamon Press Ltd.)

Keywords: *Fibers, *Mathematical models, *Equations of motion, *Deposition, *Air pollution effects(Humans), Aerosols, Ellipsoids, Shear rate, Rotation, Aerodynamic characteristics, Particle shape, Health hazards, Ceramic fibers, Glass fibers, Revolution, Risk assessment, Industrial hygiene, Occupational exposure, Lung, Cross sections, Asbestos, Reprint, *PER(Prolate ellipsoids of revolution), *Triaxial ellipsoids, PBPK Modeling, Inhaled particles.

PB94-163938/REB PC A02/MF A01
National Heart, Lung, and Blood Inst., Bethesda, MD.
Behavior of Hygroscopic Pharmaceutical Aerosols and the Influence of Hydrophobic Additives. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
A. J. Hickey, and T. B. Martonen. c1993, 8p EPA/600/J-94/214
Grant NHLBI-HL-19704
Pub. in Pharmaceutical Research, v10 n1 p1-7 Jul 93. Prepared in cooperation with Illinois Univ. at Chicago Circle. Dept. of Pharmaceutics. Sponsored by National Heart, Lung, and Blood Inst., Bethesda, MD. and Science and Engineering Research Council, Swindon (England).

The high temperature and relative humidity in the lung can result in the hygroscopic growth of susceptible aerosol particles or droplets. The term hygroscopic growth describes the increase in particle diameter which occurs as the result of association with water vapor. The influence of hygroscopicity upon lung deposition of aerosols has been a productive area of research in industrial hygiene, environmental sciences, and inhalation toxicology. Many pharmaceutical inhalation aerosols display hygroscopic behavior in their passage through the airways; however, the effect has been neglected. Controlling the phenomenon of hygroscopic growth and, thus, the related lung deposition of aerosols might result in the therapeutic advantage of targeting the site of action. Such an approach might also allow identification of the location of pharmacologic receptor sites in the lung. The review discusses an approach to achieving control of hygroscopic growth of aerosol particles. (Copyright (c) 1993 Plenum Publishing Corporation.)

Keywords: *Drugs, *Aerosols, *Hygroscopic waters, *Respiration, *Additives, Lung, Toxicology, Temperature, Glycerol, Fatty acids, Particle size, Reprint, Hydrophobic interactions.

PB94-163946/REB PC A03/MF A01
Ozone Effect on Respiratory Syncytial Virus Infectivity and Cytokine Production by Human Alveolar Macrophages. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Human Studies Div.
J. Soukup, H. S. Koren, and S. Becker. c1993, 11p EPA/600/J-94/215
Pub. in Environmental Research 60, p178-186 Feb 93. Prepared in cooperation with TRC Environmental Corp., Chapel Hill, NC.

The study was performed to evaluate the effect of ozone (O3) exposure at 1 ppm for 2 hr on the susceptibility/resistance of adult human alveolar macrophages (AM) to infection with respiratory syncytial virus (RSV) in vitro and on RSV-induced cytokine production by the AM. AM were first exposed to O3 or to filtered air and then infected with RSV at multiplicities of infection (m.o.i.) of 0.1 1.0 and 10. The percentage RSV-infected AM and the amount of infectious virus released by the cells were determined at Days 2 and 4 after infection. Interleukin (IL)-1, IL-6, and tumor necrosis factor (TNF) levels in the supernatants were determined on Day 2. No difference in the percentage infected AM or in the amount of infectious RSV produced was found between control and O3-exposed cultures. However, O3-exposed AM infected with RSV at m.o.i. 1 produced less IL-1 in response to RSV infection than control AM:63.6 pg/ml compared with 98.5 pg/ml. No difference in IL-1 was seen with m.o.i. 10. IL-6 levels were also decreased, but only after infection with m.o.i. 0.1. At this level of infection 830 pg/ml was produced by control AM as compared to 468.2 pg/ml by O3-exposed AM. TNF production was unaffected by O3 at all multiplicities of infection. (Copyright (c) 1993 by Academic Press, Inc.)

Keywords: *Respiratory syncytial virus, *Cytokines, *Ozone, *Air pollution effects(Humans), *Toxicity, *Alveolar macrophages, Virulence, Tumor necrosis factor, Interleukin-1, Interleukin-6, Biosynthesis, Reprint.

PB94-163953/REB PC A02/MF A01
Health Effects Research Lab., Research Triangle Park, NC.
Fetal Dexamethasone Exposure Accelerates Development of Renal Function: Relationship to Dose, Cell Differentiation and Growth Inhibition. Journal article.
Duke Univ. Medical Center, Durham, NC. Dept. of Pharmacology.
T. A. Slotkin, F. J. Seidler, R. J. Kavlock, and J. A. Gray. c1992, 9p EPA/600/J-94/216
Grant EPA-R-813769
Pub. in Jnl. of Developmental Physiology 17, p55-61 Jul 92. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

Fetal exposure to high doses of glucocorticoids slows cellular development and impairs organ performance, in association with growth retardation. Nevertheless, low doses of glucocorticoids may enhance cell differentiation and accelerate specific functions. The current study examined this apparent paradox in the developing rat kidney, using doses of dexamethasone that span the threshold for growth impairment: 0.05 or 0.2 mg/kg given on gestational days 17, 18 and 19. At the lower dose, which did not significantly retard body growth, the postnatal development of tubular reabsorptive capabilities for sodium, potassium, osmotic particles, water and urea was accelerated. These effects were less notable at the higher dose, which caused initial body growth impairment. (Copyright (c) Caxton Communications Limited.)

Keywords: *Dexamethasone, *Kidney, *Cell differentiation, *Fetal growth retardation, Pharmacology, Dose-response relationships, Glucocorticoids, Urinalysis, Sodium, Potassium, Urea, Water, Fetus, Rats, Organ weight, Glomerular filtration rate, Reprint, *Health effects, Tubular function.

PB94-163961/REB PC A02/MF A01
National Research Council, Washington, DC.
Molecular Analysis of Mutations Induced at the 'hisD3052' Allele of Salmonella by Single Chemicals and Complex Mixtures. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
D. M. DeMarini, D. A. Bell, J. G. Levine, M. L. Shelton, and A. Abu-Shakra. c1994, 8p EPA/600/J-94/218
Pub. in Environmental Health Perspectives Supplements, v101 sup3 p207-212 Dec 93. Prepared in cooperation with North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering. Sponsored by National Research Council, Washington, DC.

More single chemicals and complex environmental mixtures have been evaluated for mutagenicity at the hisD3052 allele of Salmonella, primarily in strain TA98, than in any other mutation assay. The development of colony probe hybridization procedures and the application of the of the polymerase chain reaction and direct DNA sequencing has permitted rapid molecular access to this allele. The authors discuss these techniques and the resulting mutation spectra that have been induced by a variety of environmental mutagens and complex mixtures. A common GC or CG deletion within a hot-spot region of the sequence dominates most of the spectra. In addition to this two-base deletion, they have recovered about 200 other types of mutations within the 72-base target for reversion of the hisD3052 allele. These include a variety of deletions (as large of 35 bases), duplications (as large as 46 bases), and complex mutations involving base substitutions. The quasipalindromic nature of the target sequence and its potential to form DNA secondary structures and slippage mismatches appear to be an important basis for the mutability of this allele.

Keywords: *Mutations, *Salmonella, *Toxic substances, *Environmental pollutants, Mixtures, Alleles, Polymerase chain reaction, Nucleic acid conformation, Deoxyribonucleic acids, Sequence deletion, Reprint.

PB94-164027/REB PC A08/MF A02
Final Regulatory Impact Analysis: Refueling Emission Regulations for Light Duty Vehicles and Trucks and Heavy Duty Vehicles.
Environmental Protection Agency, Ann Arbor, MI. Office of Mobile Sources.
Jan 94, 159p

Culminating a rulemaking process which has spanned more than a decade, the Environmental Protection Agency (EPA) is now promulating final regulations requiring all highway light-duty vehicles, light-duty trucks, and heavy-duty vehicles to meet onboard refueling vapor recovery (ORVR or onboard control) standards. The purpose of this analysis is to evaluate the costs, benefits, and overall cost effectiveness of onboard control for the reduction of refueling emissions from highway motor vehicles.

Keywords: *Heavy duty vehicles, *Light duty vehicles, *Refueling losses, *Air pollution control, Pollution regulations, Vehicles operating costs, Cost effectiveness, Air pollution economics, Gasoline, Emission factors, Evaporative emissions, Ozone, Vapor pressure, Mobile pollutant sources, Light duty trucks, Vapor recovery systems.

PB94-164340/REB PC A03/MF A01
Response of the Chesapeake Bay Water Quality Model to Loading Scenarios (A Report of the Modeling Subcommittee, Chesapeake Bay Program Office, Annapolis, MD). Technology transfer rept.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
R. V. Thomann, J. R. Collier, A. Butt, E. Casman, and L. C. Linker. Jan 94, 23p CBP/TRS-101/94

A modeling framework was constructed for the Chesapeake Bay system to provide a credible basis to assist the decision-making process and to further the understanding of Bay water quality processes and the sensitivity of such processes to external nutrient loading. The modeling structure consists of a Watershed Model to generate nutrient loads from the Bay sub-basins; a three-dimensional, time variable hydrodynamic model; and a three-dimensional, time variable model of water quality coupled to a model of sediment chemistry. Extensive calibration analyses of the entire modeling structure was conducted using data collected primarily during a three year period from 1984-1986. The Chesapeake Bay Program Modeling Subcommittee completed its initial review of the Chesapeake Bay Water Quality Model (CBWQM) calibration in May 1991 and concluded the model could provide useful information to the Bay community, especially with respect to dissolved oxygen problems in the deep water of the main Bay. Final calibration of the CBWQM was completed in January 1992.

Keywords: *Water quality data, *Nutrients, *Pollution control, *Chesapeake Bay, Air pollution, Mathematical models, Watersheds, Sediments, Environmental impacts, Hydrodynamics, Reduction, Chemical analysis, Dissolved oxygen, Concentration(Composition), Nitrification, Phosphorus, Ocean environments, Point sources, Farms, Graphs(Charts), *Organic loading, Tributaries.

PB94-164415/REB PC A06/MF A02
Application of Pulse Combustion to Incineration to Liquid Hazardous Waste. Final rept. Sep 91-Aug 93.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
C. DeBenedictis. Apr 94, 105p EPA/600/R-94/060

The report gives results of a study to determine the effect of acoustic pulsations on the steady-state operation of a pulse combuster burning liquid hazardous waste. A horizontal tunnel furnace was retrofitted with a liquid injection pulse combustor that burned No. 2 fuel oil. The fuel oil was doped with surrogate principal organic hazardous constituents (POHCs). For each test condition, the burner was operated in both a pulsing and nonpulsing mode. Large amplitude acoustic pulses were generated by adjusting the burner frequency to match the natural frequency of the combustion chamber. The combustion gases were sampled to

quantify organic and particulate emissions. The results showed destruction and removal efficiency (DRE) values that were greater than six nines (99.9999%) for both pulsing and nonpulsing operations. The pulse combustor for the study was equipped with a fuel vaporization unit which may have enhanced the destruction capabilities of the burner.

Keywords: *Air pollution abatement, *Incinerators, *Hazardous materials, *Pulsation, Resonant frequency, Combustion efficiency, Combustion products, Performance evaluation, Toxicity, Liquid wastes, Fuel oil, Stationary sources, Particulates, Chlorobenzenes, Carbon tetrachloride, Pulse amplitude, *Pulse combustion, POHC(Principal organic hazardous constituents), Liquid hazardous wastes.

PB94-164811/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
United States and German Bilateral Agreement on Remediation of Hazardous Waste Sites. Interim status rept.
PRC Environmental Management, Inc., Chicago, IL.
Jan 94, 49p EPA/540/R-94/500
Contracts EPA-68-CO-0047, FKZ-1470729
Prepared in cooperation with Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.). Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The interim status report summarizes the progress of a bilateral technology transfer agreement between Germany's Bundesministerium fur Forschung und Technologie (BMFT) and the U.S. Environmental Protection Agency (EPA). This chapter discusses the program's background, goals, and approach. Chapters 2 and 3 discuss demonstration of hazardous waste treatment technologies in Germany and the United States. Chapter 4 summarizes the accomplishments and benefits of the bilateral activities already underway, and Chapter 5 discusses the future goals, approach, and activities of the U.S.-German bilateral agreement.

Keywords: *United States, *Germany, *Hazardous materials, *Waste management, Remediation, Soil contamination, Superfund, Land pollution control, Bilateral agreements, International cooperation, Pollution control equipment, Environmental research, Technology transfer, Technology utilization, Innovative treatment technologies.

PB94-165214/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Evaluation of an Electrodialytic Process for Purification of Hexavalent Chromium Solutions.
Battelle, Columbus, OH.
D. W. Folsom, J. A. Jones, and R. F. Olfenbuttel. Apr 94, 36p EPA/600/R-94/071
Contract EPA-68-CO-0003
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The evaluation addresses the waste reduction and economics of an electrodialytic process that can be used to selectively remove impurities that build up in chromic acid solutions with use. The removal of impurities extends the useful life of the chromic acid solution and reduces periodic replacement of the solution. The electrodialytic units tested in this evaluation were manufactured by Ionsep(TM). The units were tested at SL Modern Hard Chrome in Camden, New Jersey, for a hard chromium plating solution and at Paramax in St. Paul, Minnesota, for a chromic acid solution etching copper from printed wire boards.

Keywords: *Electrodialysis, *Chromic acid, *Purification, Metal finishing, Electroplating, Printed circuits, Circuit boards, Chemical etching, Chromium, Metals, Ions, Hazardous materials, Waste treatment, Reclamation, Recycling, Pollution abatement, Cost engineering, Quality control, Electronics industry, *Waste minimization, Source reduction, Pollution prevention, St. Paul(Minnesota), Camden(New Jersey).

PB94-165230/REB PC **A03**/MF **A01**
Meeting Summary: National Advisory Council on Environmental Policy and Technology. Subcommittee on Radiation Cleanup Regulation Conference Call on February 24, 1994.
Environmental Protection Agency, Washington, DC. Office of Radiation and Indoor Air.
Mar 94, 22p EPA/402/S-94/002

The issues discussed were: identification and selection of radiation site cleanup levels; implementation decisions about future uses of remediated sites; site-specific public participation, which is closely related to future land use; and preliminary issues on waste disposal.

Keywords: *Radioactive waste management, *Decontamination, *Meetings, Radioactive waste disposal, Pollution control, Site characterization, Radiation hazards, Remediation, Risk assessment, Decision making, Public relations, Pollution regulations, Environmental issues, Government policies, NACEPT(National Advisory Council on Environmental Policy and Technology).

PB94-165321/REB PC **A04**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Substitution of Cadmium Cyanide Electroplating with Zinc Chloride Electroplating.
Battelle, Columbus, OH.
B. C. Kim, P. R. Webb, J. A. Gurklis, and R. K. Smith.
May 94, 73p EPA/600/R-94/074
Contract EPA-68-CO-0003
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The study evaluated the zinc chloride electroplating process as a substitute for cadmium cyanide electroplating in the manufacture of industrial connectors and fittings at Aeroquip Corporation. The process substitution eliminates certain wastes, specifically cadmium and cyanide, which are listed among the 17 priority toxic pollutants designated by the U.S. EPA, although as will be seen, zinc and chromium wastes increased with the process change.

Keywords: *Electroplating, *Pollution control, Waste water, Metal finishing, Cadmium coatings, Zinc coatings, Sludges, Chlorine, Innovative technology, Chromium, Corrosion tests, Van Wert(Ohio).

PB94-165339/REB PC **A04**/MF **A01**
Environmental Monitoring and Assessment Program: Arid Ecosystems 1993 Implementation Plan Colorado Plateau Pilot Design Pilot Study.
Environmental Monitoring Systems Lab., Las Vegas, NV.
W. G. Kepner, R. O. Kuehl, R. P. Breckenridge, J. R. Baker, and D. O'Leary. Dec 93, 72p EPA/620/R-93/016

Three indicator categories of arid ecosystem condition (spectral properties; vegetation composition and abundance; and soil properties) were tested during the summer of 1992 in the southeastern Utah portion of the Colorado Plateau. The focus of the 1992 study was the development of three indicator categories with particular regard to (1) estimation of selected components of sampling variance, (2) use of remotely sensed information to selected sample frame materials, and (3) operational aspects of indicator implementation such as field logistics, quality assurance procedures, and information management. The 1992 Colorado Plateau Pilot Study provided a significant first step towards regional and national implementation of EMAP-Arid. Additionally, the study results provide a further mechanism for coordination of indicator development and for evaluation with collaborators from participating agencies and the external scientific community, especially via the peer review process.

Keywords: *Colorado Plateau, *Arid lands, *Ecosystems, Biological indicators, Indicator species, Vegetation, Formicidae, Soils, Soil properties, Sampling, Natural resources management, Environment management, Information management, Quality assurance, Environmental surveys, EMAP(Environmental Monitoring and Assessent Program), Ants.

PB94-165354/REB PC **A09**/MF **A03**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Potential Groundwater Contamination from Intentional and Nonintentional Stormwater Infiltration.
Project rept. 1 Oct 92-30 Sep 93.
Alabama Univ. at Birmingham.
R. Pitt, S. Clark, and K. Parmer. May 94, 196p EPA/600/R-94/051
Grant EPA-R-819573
See also PB93-222180. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The purpose of this report is to provide guidance to stormwater planners, drainage engineers, and local regulatory personnel concerning groundwater contamination potential of stormwater infiltration practices. It includes and extensive literature review of groundwater problems associated with stormwater. Most stormwater can likely be infiltrated with minimal impacts. Removal processes in soils are likely to reduce most infiltrated pollutants. However, some pollutants are much more likely to cause problems than most. These must be more carefully considered in infiltration projects. Critical pollutant source areas need to be avoided and pretreatment before infiltration to remove particulate forms of the pollutants should be considered.

Keywords: *Ground water, *Storm water runoff, *Water pollution sources, Infiltration, Waste water, Storm drains, Storm sewers, Drainage, Urban runoff, Path of pollutants, Environmental transport, Hazardous materials, Water pollution effects, Pretreatment, Water pollution control, Literature surveys.

PB94-165651/REB PC **A03**/MF **A01**
Toxic Substances Control Act (TSCA) Chemical Substances Inventory: Revised Inventory Synonym and Preferred Name File, May 1, 1994. Data Tape Documentation.
Environmental Protection Agency, Washington, DC.
May 94, 36p
For system on magnetic tape, see PB94-501749.

The report supplies supporting documentation for the Toxic Substance Control Act Chemical Substances Inventory on magnetic tape (PB94-501749)

Keywords: *Documentation, *Chemical compounds, Nomenclature, Chemical properties, Molecular structure, Inventories, Chemical Substances Inventory, Toxic Substances Control Act, CAS Registry Number, Molecular formula.

PB94-166311/REB PC **A17**/MF **A04**
Environmental Protection Agency, Washington, DC. Engineering and Analysis Div.
Methods for the Determination of Nonconventional Pesticides in Municipal and Industrial Wastewater, Volume 2.
DynCorp Viar, Inc., Reston, VA. Environmental Services Div.
T. E. Fielding, and W. A. Telliard. Aug 93, 397p EPA/821/R-93-010B
Contract EPA-68-C9-0019
See also Volume 1, PB94-121654. Sponsored by Environmental Protection Agency, Washington, DC. Engineering and Analysis Div.

The volume contains 13 of the 500-series methods and one 200-series method developed by EPA's Environmental Monitoring Systems Laboratory in Cincinnati, Ohio since the mid-1980's for the determination of pesticide active ingredients.

Keywords: *Pesticides, *Chemical analysis, *Water pollution detection, *Water quality standards, Municipalities, Test methods, Waste water, Industrial wastes, Chemical industry, Manufacturing, Chlorinated hydrocarbons, Nitrogen, Drinking water, Phosphorus, Polychlorinated biphenyls, Chromatographic analysis.

PB94-166345/REB PC **A08**/MF **A02**
California State Air Resources Board, Sacramento.
On-Road Remote Sensing of CO and HC Emissions in California. Final rept.
Denver Univ., CO. Dept. of Chemistry.
D. H. Stedman, G. A. Bishop, S. P. Beaton, J. E. Peterson, and P. L. Guenther. Feb 94, 152p ARB-R-94/518
Contract ARB-A032-093
Sponsored by California State Air Resources Board, Sacramento.

The University of Denver used its remote sensor for motor vehicle CO and HC emissions to measure the tailpipe concentrations of over 90,000 California Vehicles in a 30-day period in 1991. The study consisted of three phases; a series of controlled tests, a pullover study of high-emitters, and a series of measurements

at a variety of sites around the South Coast Air Basin and northern California. The highest CO emissions occurred under hard accelerations, while the highest HC emissions occurred during decelarations. In the pullover study, over 92% of the vehicles identified as high emitters failed the roadside inspection, equivalent to a California Smog Check. More than 60% of the vehicles stopped had defective emission control equipment (over 40% were tampered). The highest emitting vehicles showed the most variability in their emissions. This variability carries implications for the design of inspection and maintenance programs.

Keywords: *Carbon monoxide, *Hydrocarbons, *Air pollution monitoring, *California, Motor vehicles, Remote sensing, Infrared detectors, Vehicle air pollution, Automobile exhaust, Acceleration, Driving style effect on exhaust emissions, Inspection, Exhaust pipes.

PB94-166378/REB PC A03/MF A01
Pesticide Reregistration Rejection Rate Analysis Residue Chemistry. Follow-up. Guidance for: Conducting Plant and Livestock Metabolism Studies.
Environmental Protection Agency, Washington, DC.
16 Jul 92, 18p

A Rejection Rate Analysis for Residue Chemistry studies carried out by CBRS and CBTS and SRRD along with input from NACA representatives, indicated the need for the Agency to provide additional guidance on conducting plant and livestock metabolism studies. The paper addresses the points determined to need clarification. The paper is not intended to replace existing documents but to expand upon them. It will be utilized by the Chemistry Branches in future reviews of metabolism studies.

Keywords: *Pesticide residues, *Plants(Botany), *Livestock, Chemical analysis, Biochemistry, Metabolism, Animals, Crop production, Toxicity, Testing, Reviewing, Environmental transport, Agricultural chemistry, *Rejection rate analysis, Reregistration, Environmental fate.

PB94-166386/REB PC A03/MF A01
Pesticide Reregistration Progress Report, January 1994.
Environmental Protection Agency, Washington, DC. Office of Prevention, Pesticides and Toxic Substances.
Jan 94, 31p EPA/738/R-94/001
See also PB94-133832.

This issue of the Progress Report describes the status of reregistration through the first quarter 1994 fiscal year (FY 94). Cumulative information is provided in Appendix A, entitled Cumulative Summary of Reregistration Actions.

Keywords: *Pesticides, *Evaluation, Reviewing, Suspending, Rejection, Requirements, Pollution regulations, Administrative procedures, Government policies, *Reregistration, FIFRA(Federal Insecticide Fungicide and Rodenticide Act).

PB94-166394/REB PC A10/MF A03
Reregistration Eligibility Decision (RED): Methiocarb.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Feb 94, 208p EPA/738/R-94/002

This document presents the Agency's decision regarding the reregistration eligibility of the registered uses of methiocarb. The document consists of six sections. Section I is the introduction. Section II describes methiocarb, its uses, data requirements and regulatory history. Section III discusses the human health and environmental assessment based on the data available to the Agency. Section IV presents the reregistration decision for methiocarb. Section V discusses the reregistration requirements for methiocarb. Finally, Section VI is the Appendices which support this Reregistration Eligibility Decision document.

Keywords: *Pesticides, *Toxicity, Insecticides, Acaricides, Molluscacides, Chemical properties, Risk assessment, Environmental effects, Exposure, Humans, Animals, Pollution regulations, Labels, *Reregistration, *Methiocarb, Use patterns, CAS 2032-65-7.

PB94-166402/REB PC A09/MF A02
Reregistration Eligibility Decision (RED): Tri(hydroxymethyl) nitromethane.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Sep 93, 178p EPA/738/R-93/020, EPA/738/R-93/020

The document presents the Agency's decision regarding the reregistration eligibility of the registered uses of 2-(hydroxymethyl)-2-nitro-1,3-propanediol. The document consists of six sections. Section I is the introduction. Section II describes 2-(hydroxymethyl)-2-nitro-1,3-propanediol, its uses, data requirements and regulatory history. Section III discusses the human health and environmental assessment based on the data available to the Agency. Section IV presents the reregistration decision for 2-hydroxymethyl-2-nitro-1,3-propanediol. Section V discusses the reregistration requirements for products containing this active ingredient. Finally, Section VI is the Appendices which support this Reregistration Eligibility Decision.

Keywords: *Pesticides, *Toxicity, Nitromethane, Disinfectants, Chemical properties, Risk assessment, Environmental effects, Exposure, Humans, Animals, Pollution regulations, Labels, *Nitromethane/tris(hydroxymethyl), *Reregistration, Microbiocides, Bacteriostats, Use patterns, CAS 126-11-4.

PB94-168028/REB PC A06/MF A02
Examination of the Blue Crab Fishery in the Pamlico River Estuary. Final rept.
North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.
S. McKenna, and J. T. Camp. Dec 92, 115p APES-92-08
Prepared in cooperation with Environmental Protection Agency, Research Triangle Park, NC. National Estuary Program.

The Pamlico River Estuary (including the Pamlico and Pungo rivers and their associated feeder streams) recently experienced a decline in blue crab production. The causative agents and the severity of the decline are unknown. However, public opinion has laid the majority of the blame on the crab trawl fishery. This opinion coupled with the lack of fishery dependent data for the crab trawl and pot fisheries has put managers in a difficult position. In order to optimize yield for this resource up-to-date fishery-dependent data, such as size and sex composition of catches, number and weight of individuals in the catch, and effort data, were needed. The objectives of this study were to examine (1) harvest rates and bycatch in the crab pot and trawl fisheries; (2) the physical injury and immediate mortality of blue crabs in the pot and trawl fishery; and (3) the level of delayed mortality of blue crabs in the pot and trawl fisheries.

Keywords: *Pungo River, *Fisheries, *Pamlico River, *Crabs, Species diversity, Estuaries, Commercial shellfish, Trawling, Mortality, Harvesting, Commercial fishing, Catch statistics.

PB94-168069/REB PC A02/MF A01
RED Facts: Methiocarb. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Feb 94, 10p EPA/738/F-94/002
See also PB87-190898 and PB94-191920.

The fact sheet summarizes the information in the RED for methiocarb. Methiocarb was first registered as a pesticide in the U.S. in 1972. EPA issued a Registration Standard for methiocarb in March 1987 (NTIS No. PB87-190898), requiring additional product chemistry, residue chemistry, ecological effects, environmental fate, toxicology, and occupational and residential exposure data. The methiocarb producers deleted all food uses from their product labels between 1989-92, so residue chemistry studies are no longer required. Currently, 22 pesticide products are registered which contain the active ingredient methiocarb.

Keywords: *Pesticides, Insecticides, Molluscicides, Acaricides, Toxicity, Risk assessment, Exposure, Environmental effects, Pollution regulations, Requirements, Labels, *Methiocarb, *Reregistration, Use patterns, CAS 2032-65-7.

PB94-168077/REB PC A01/MF A01
RED Facts: 2-((Hydroxymethyl)-amino)ethanol. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Dec 93, 5p EPA/738/F-93/024

The fact sheet summarizes the information in the RED document for 2-((hydroxymethyl)amino)ethanol. 2-((hydroxymethyl)amino)ethanol was first registered in the United States in 1970 for use as an industrial preservative, and currently is used in the manufacture of many water-based industrial products. Three pesticide products are registered which contain this active ingredient.

Keywords: *Pesticides, Fungicides, Toxicity, Risk assessment, Exposure, Environmental effects, Pollution regulations, Requirements, Labels, *Ethanol/hydroxymethyl-amino, *Reregistration, Use patterns, Bacteriostats, CAS 65184-12-5.

PB94-168101/REB PC A03/MF A01
Testing of an Electric Vehicle on a Clayton Water-Brake Chassis Dynamometer. Technical rept.
Environmental Protection Agency, Ann Arbor, MI. Technology Development Group.
R. M. Schaefer. Mar 94, 18p EPA/AA/TDG-94/01

The report describes the testing results of a 1988 Ford Escort Wagon equipped with a lead-acid battery propulsion system. The vehicle was tested for energy consumption and range on a Clayton water-brake chassis dynamometer at the EPA National Vehicle and Fuel Emissions Laboratory in Ann Arbor, Michigan. This testing was part of a round-robin test program with the U.S. Department of Energy, Ford Motor Company, and the California Air Resources Board. The report also describes the test procedures, a description of the test vehicle, the test facilities, and a discussion of the test results.

Keywords: *Electric-powered vehicles, *Energy consumption, Electric batteries, Fuel economy, Automobiles, Test methods, Test facilities, US DOE, US EPA, Dynamometers, California Air Resources Board, Corporate Average Fuel Economy, Ford Motor Company.

PB94-168135/REB PC A02/MF A01
RED Facts: Tris(hydroxymethyl)-nitromethane. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Sep 93, 10p EPA/738/F-93/016

The fact sheet summarizes the information in the RED document for the reregistration case Tris(hydroxymethyl) nitromethane, which contains the active ingredient 2-(hydroxymethyl)-2-nitro-1,3-propanediol. 2-(hydroxymethyl)-2-nitro-1,3-propanediol was first registered in the U.S. in 1955, as an industrial bactericide and slimicide. EPA has issued three relevant Data Call-In (DCI) Notices: the Antimicrobial DCI in March 1987, the comprehensive reregistration Phase 4 DCI in September 1992, and a third DCI in August 1993, the latter for residue data. Currently, nine pesticide products are registered which contain this active ingredient.

Keywords: *Pesticides, *Toxicity, Nitromethane, Disinfectants, Chemical properties, Risk assessment, Environmental effects, Exposure, Humans, Animals, Pollution regulations, Labels, *Reregistration, Nitromethane/tris(hydroxymethyl), Microbiocides, Bacteriostats, Use patterns, CAS 126-11-4.

PB94-168374/REB PC A03/MF A01
Environmental Research Lab., Athens, GA. Office of Research and Development.
PATRIOT: A Methodology and Decision Support System for Evaluating the Leaching Potential of Pesticides. Environmental research brief.
AQUA TERRA Consultants, Decatur, GA.
J. C. Imhoff, P. R. Hummel, J. L. Kittle, and R. F. Carsel. Feb 94, 11p EPA/600/S-93/010
Contract EPA-68-CO-0019
See also PB89-220008 and PB93-174027. Sponsored by Environmental Research Lab., Athens, GA. Office of Research and Development.

The Pesticide Assessment Tool for Rating Investigations of Transport (PATRIOT) is a methodology for

providing rapid analyses of groundwater vulnerability to pesticides on a regional, state, or local level. The PATRIOT software package integrates, in a personal computer environment, a tool that enables scientifically sound analysis of pesticide leaching potential with the data needed to use the tool for area-specific analyses anywhere in the conterminous United States. PATRIOT is comprised of (1) a chemical fate and transport model (PRZM-2), (2) a comprehensive database, (3) an interface that allows the user to explore the database and select the data appropritate to characterize local environmental factors and pesticide application scenarios, (4) a directed sequence of interaction that guides the user in providing all the necessary information to perform alternative model analyses, and (5) effective, user-selected methods of summarizing and visualizing model results.

Keywords: *Pesticides, *Environmental transport, *Leaching, Ground water, Water pollution abatement, Land pollution, Environmental management, State government, Data base management, Regional analysis, Soil analysis, Hydrology, Climate, *PATRIOT System, PATRIOT(Pesticide Assessment Tool for Rating Investigations of Transport), PRZM-2 model.

PB94-169463/REB PC **A07**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Pilot-Scale Evaluation of the Potential for Emissions of Hazardous Air Pollutants from Combustion of Tire-Derived Fuel. Final rept. Feb 92-Oct 93.
Acurex Corp., Research Triangle Park, NC.
P. M. Lemieux. May 94, 136p EPA/600/R-94/070
Contract EPA-68-DO-0141, Grant EPA-R-814945-01-0
Prepared in cooperation with Arkansas Univ., Fayetteville. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

Experiments were conducted in a 73kW (250,000 Btu/hr) rotary kiln incinerator simulator to examine and characterize emissions from incineration of scrap tire material. The purposes of this project are to: (1) generate a profile of target analytes for full-scale stack sampling efforts, not to generate statistically defensible emission factors for the controlled combustion of scrap tire material; and (2) where possible, give insight into the technical issues and fundamental phenomena related to controlled combustion of scrap tires. Along with continuous emissions monitoring for oxygen (O2), carbon dioxide (CO2), carbon monoxide (CO), nitric oxide (NO), sulfur dioxide (SO2), and total hydrocarbons (THCs), samples were taken to examine volatile and semi-volatile organics, polychlorinated p-dibenzodioxins and dibenzofurans (PCDD/PCDF), and metal aerosols. In addition, a continuous polycyclic aromatic hydrocarbon (PAH) analyzer was used in all the tests. Samples were analyzed with an emphasis on the 189 hazardous air pollutants (HAPs) listed in the 1990 Clean Air Act Amendments (CAAA), but other compounds were also identified where possible.

Keywords: *Tire fires, *Incineration, *Air pollution monitoring, Tire materials, Hazardous materials, Combustion products, Toxicity, Incinerators, Scrap, Emissions, Chemical analysis, Stack gases, Particulates, Waste disposal, Refuse derived fuels, Hazardous air pollutants, Volatile organic compounds.

PB94-169828/REB PC **A03**/MF **A01**
Package Plants for Small Water Supplies: The U.S. Experience. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. M. Clark, J. A. Goodrich, and B. W. Lykins. c1994, 14p EPA/600/J-94/242
Pub. in Jnl. Water SRT, Aqua, V43 n1 p23-34 1994. See also PB83-161018 and PB93-116267.

Tens of thousands (over 58,000) small or very small regulated community water systems (approximately 500 population served) in the United States will have a difficult time in complying with the requirements of the US Safe Drinking Water Act and its Amendments. One option available to small utilities in the United States is the installation of package treatment plants. Package technologies, which are assembled in a factory, skid mounted and transported to the site, offer an alternative to in-ground conventional treatment technology. The major advantage of package plants are their compact size, cost-effectiveness, relative ease of operation and design for unattended operation. Performance data demonstrate that package plants can meet traditional goals with regard to controlling microbiological contaminants and turbidity. In general, package plants not meeting the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) have problems caused by lack of operator attention, such as not varying chemical dosage to meet changing raw water quality and by failure to run for periods of time long enough to achieve stable operation.

Keywords: *Water treatment plants, *Water supply, *Pollution regulations, *Water pollution control, Alternatives, Standards compliance, Safe Drinking Water Act, Microorganisms, United States, Water quality management, Turbidity, Water pollution standards, Reprints, *Small systems, *Package treatment plants, Maximum contaminant levels.

PB94-169836/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Life-Cycle Improvements Analysis: Procedure Development and Demonstration. Symposium paper.
Battelle, Columbus, OH.
B. W. Vigon, and M. A. Curran. c1993, 8p EPA/600/A-94/081
Contract EPA-68-C0-0003
Pub. in Proceedings of the Institute of Electrical and Electronics Engineers International Symposium on Electronics and the Environment, Arlington, VA., May 10-12, 1993, p151-156. See also PB93-139681 and PB93-164507. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The use of life-cycle assessment (LCA) methods for identifying, evaluating, and selecting among alternative opportunities for improving the energy, resource, and environmental release profile of a product or process is in its infancy. Methods development and demonstration efforts are being supported by the U.S. Environmental Protection Agency. The paper discusses some of these efforts in the context of linkages with other related product design and development tools. (Copyright (c) 1993 IEEE.)

Keywords: *Service life, *Waste management, Pollution control, Pollution abatement, Waste disposal, Waste recycling, Manufacturing, Product development, Production engineering, Alternatives, Reprints, *Life cycle assessment, Waste streams, Green engineering, Product design, Process improvement.

PB94-169844/REB PC **A03**/MF **A01**
Milwaukee Cryptosporidiosis Outbreak: Investigation and Recommendations.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
K. R. Fox, and D. A. Lytle. 1993, 11p EPA/600/A-94/082
Pub. in Proceedings of the WQTC, Part 2-Session 3D through ST6, Miami, FL., November 7-11, 1993, p1767-1783.

In April of 1993, Milwaukee, Wisconsin became the major focus of the drinking water industry. The focus of attention was centered on the increase in the number of reported cases of diarrheal patients throughout the city. The major increase in diarrhea was determined to be caused by the organism Cryptosporidium which was believed to be transported throughout the city via the drinking water. As a result of the outbreak, the City contacted the US EPA's Drinking Water Research Division (DWRD) for assistance. The DWRD sent a team of two engineers to Milwaukee. The team was to assist the city in determining how the Cryptosporidium may have passed through the drinking water treatment plant. The team conducted a rapid engineering assessment of the two treatment plants supplying the city with water. They also evaluated plant operational and laboratory data available for the time frame of concern. This paper discusses the efforts that the team took during the investigation. The recommendations that were made for improving the operation of the water treatment plants are also discussed.

Keywords: *Potable water, *Water pollution effects(Humans), *Water treatment plants, *Cryptosporidium, Reprints, Wisconsin, Filtration, Microorganism control(Water), Lake Michigan, Water pollution control, US EPA, Epidemiology, Coagulants, Flocculants, Civil engineering, *Milwaukee(Wisconsin), Howard Water Treatment Plant, Linwood Water Treatment Plant.

PB94-169851/REB PC **A03**/MF **A01**
Lessons Learned from Siting of Boston Harbor Sewage Outfall. Book chapter.
Environmental Protection Agency, Narragansett, RI. Environmental Research Lab.
J. F. Paul, and E. H. Dettmann. 1994, 20p EPA/600/A-94/083, ERLN-1035
Pub. in Transport and Transformation of Contaminants Near the Sediment-Water Interface, Chapter 3, p17-33 1994. See also PB86-103744 and PB86-137478.

The intention of this chapter is to review briefly the recent history of the regulatory actions affecting the wastewater outfalls in Boston Harbor, with emphasis on the role of models for particulate behavior, in particular, sedimentation. This review of the Boston Harbor situation serves to illustrate where the state-of-the-science is in the application and use of modeling tools for addressing environmental problems in aquatic systems.

Keywords: *Boston Harbor, *Outfall sewers, *Water pollution control, *Sewage disposal, *Particulates, *Sewage sludge, Massachusetts Bay, Clean Water Acts, Marine disposal, Environmental management, Decision making, Sediment-water interfaces, Sedimentation, Mathematical models, Pollution regulations, Sludge disposal, Ocean waste disposal, Reprints, Publicly owned treatment works.

PB94-169869/REB PC **A03**/MF **A01**
Research Needs and Summary: Environmental Management Perspective (Chapter 16). Book chapter.
Environmental Protection Agency, Narragansett, RI. Environmental Research Lab.
J. F. Paul, J. V. DePinto, and W. Lick. c1994, 14p EPA/600/A-94/084, ERLN-1510
Pub. in Transport and Transformation of Contaminants Near the Sediment-Water Interface, p329-339 1994.

The point of view that has been taken in the preparation of the material in this volume is that we wanted to show to what extent the research community has been able to provide necessary tools to environmental managers for use in decision making. After all, in addition to providing a better understanding of the world in which we live, we would like to provide environmental decision-makers with the best scientific information available for use in their deliberations. We must all recognize, however, that decisions are not made solely on the basis of the scientific information presented. Economics, societal values, legislative mandates and regulations, politics, and public perceptions all play a role in the ultimate settlement of environmental issues. But this reality should not deter us from providing sound technical advice. The goal of the work that has been presented in this volume and of research needs that are provided later in this chapter is to provide scientifically credible information to environmental managers. This directed research is multidisciplinary, and requires coordination among many investigators if the end result is to be credible and useful.

Keywords: *Environmental research, *Environmental management, *Sediments, *Water pollution control, Sediment-water interfaces, Decision making, Models, Technology utilization, Environmental quality, Reprints.

PB94-169877/REB PC **A03**/MF **A01**
DNA Modifications: Investigations by Mass Spectrometry (Chapter 3). Book chapter.
Environmental Protection Agency, Narragansett, RI. Environmental Research Lab.
C. B. Norwood, and P. Vouros. 1994, 47p EPA/600/A-94/085, ERLN-1426
Pub. in Mass Spectrometry: Clinical and Medical Applications, v2 p89-136 1994.

DNA, deoxyribonucleic acid, is crucial to life. With its triplet coding, DNA serves as the template for messenger RNA, and is therefore responsible for the myriad proteins that ensure the ongoing health and life of the current cell or organism. Future generations are similarly dependent on the DNA code, which cellular mechanisms help propagate. DNA strands must remain intact and undamaged to guarantee that the code functions with high fidelity. If DNA becomes covalently damaged, repair mechanisms can excise the affected region and replace it with the correct sequence. Indications of the biochemical transformation can be found among the excretion products of the cell

or organism. However, the repair processes do not always work perfectly, and certain modifications escape the repair system. These covalent modifications may be of critical importance to the causes of disease states, including carcinogenesis. In addition, certain medications, known to generate covalent modifications of DNA, are used therapeutically in an effort to combat an observed disease state. These deliberately produced DNA modifications also need to be studied. In the review, the term DNA modification includes not only DNA adducts (xenobiotic compounds covalently bound to DNA) but also other aberrant forms of DNA, such as ring-opened products and dimers.

Keywords: *Deoxyribonucleic acids, *Mass spectroscopy, *Nucleic acid conformation, Messenger RNA, DNA repair, Carcinogenesis, DNA adducts, Gas chromatography, Electrophoresis, Reprints.

PB94-169885/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Methane Emissions from the Natural Gas Industry: Production and Transmission Emissions.
Rept. for Apr 92-Sep 93.
Radian Corp., Austin, TX.
M. R. Harrison. 1 May 92, 16p RCN-275-026-62-04, EPA/600/A-94/086
Contract EPA-68-D1-0031
Presented at AWMA Conference, Kansas City, MO., June 22-26, 1992. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses a cofunded, Gas Research Institute/EPA project to quantify methane emissions to the atmosphere resulting from operations in the natural gas industry. Study results will measure or calculate all methane emissions, from production at the well and up to, but not including, the point of final use. When these data are combined with those of other studies than quantify greenhouse gas emissions from methane consumers (i.e., various combustion sources), a definitive comparison of the relative environmental effects of using methane versus other fuels will be possible.

Keywords: *Natural gas industry, *Methane, *Air pollution sources, Natural gas, Production, Greenhouse gases, Emission factors, Leakage, Natural gas distribution systems, Natural gas processing plants, Natural gas wells, Pipelines, Well heads, Air pollution control, Reprints.

PB94-169893/REB PC A02/MF A01
Corvallis Environmental Research Lab., OR.
Properties of Designs for Sampling Continuous Spatial Resources. Symposium paper.
SUNY-ESF, Syracuse, NY.
S. V. Stehman, and W. S. Overton. 1994, 8p EPA/600/A-94/075
Grants EPA-R-815422, EPA-R-816721
Pub. in Proceedings of the Section on Statistics and the Environment, American Statistical Association, p182-187 1991. Prepared in cooperation with Oregon State Univ., Corvallis. Sponsored by Corvallis Environmental Research Lab., OR.

Three designs were investigated for sampling continuous response variables defined over a continuous spatial region. Two of the designs were based on the triangular grid proposed for sampling environmental resources in the Environmental Monitoring and Assessment Program. Analytical and empirical results were derived under various surface models used to represent the continuous response variable. The tessellation-stratified design was generally more precise and permitted better estimation of variance than either a strict systematic design or an unrestricted random sample.

Keywords: *Sampling, Precision, Variance(Statistics), Estimating, Mathematical models, Reprints, *EMAP, *Environmental Monitoring and Assessment Program, Triangular grids.

PB94-169901/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Considerations for Planning Terrestrial Field Studies. Book chapter.
ManTech Environmental Technology, Inc., Corvallis, OR.
L. M. Ganio. 1994, 22p EPA/600/A-94/077
Contract EPA-68-C8-0006
Pub. in Proceedings of Workshop on Radio Telemetry in Support of Avian/Pesticide Field Studies, 1994. Sponsored by Corvallis Environmental Research Lab., OR.

In planning a terrestrial field study each component of the study should be considered in the context of all other components. There are close connections between the statement of the research question, the study design, the execution of the study, and the final conclusions. These components and their interrelationships are discussed in the context of field studies designed to evaluate effects of pesticides on avian species. Formulation of the research question and the design component are emphasized and attention is given to the topics of randomization, replication and error control. References for the application of these topics are provided.

Keywords: *Pesticide residues, *Birds, *Terrestrial ecosystems, Experimental design, Field tests, Animal ecology, Toxic hazards.

PB94-169919/REB PC A02/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Contaminant Leaching from Solidified-Stabilized Wastes, Overview. Book chapter.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
P. L. Bishop. 1991, 8p EPA/600/A-94/078
Pub. in Emerging Technologies in Hazardous Waste Management II, American Chemical Society, Chapter 15, p302-315 1991. See also PB87-116745. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The current state-of-the-art of solidification/stabilization (S/S) technologies is reviewed. This includes the legal impetus and basis for use of solidification/stabilization of hazardous wastes or contaminated soils, the principles and chemistry of contaminant immobilization within the waste form matrix, leaching mechanisms, and environmental factors affecting leachability. It is shown that S/S processes can be very effective at immobilizing certain waste materials, but other wastes may not be amenable to these processes.

Keywords: *Hazardous materials, *Waste forms, *Leaching, Weathering, Portland cement, Fly ash, Dust, Waste disposal, Solidification, Stabilization, Waste processing, Chemical reactions, Reaction kinetics, Land pollution, Legal aspects, Reprints.

PB94-169927/REB PC A03/MF A01
Remaining Issues for Hazardous Waste Incineration.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
C. R. Dempsey. Oct 93, 14p EPA/600/A-94/079
Pub. in Proceedings of the Enviro-Pro Expo Puerto Rico 93', San Juan, PR., October 25-28, 1993, p83-96. See also PB85-129500 and PB91-159624.

While thermal destruction represents the most effective and widely applicable control technology available today for the disposal or organic hazardous waste, a number of issues remain concerning its use in the long term. These include: Destruction effectiveness on untested/unique wastes; Control of metal emissions; Emissions of combustion byproducts; Detection of process failure; Real-time performance assurance; and Role of innovative technology.

Keywords: *Hazardous materials, *Incineration, *Environmental issues, Combustion products, Exhaust emissions, Air pollution control, Combustion efficiency, System failures, Performance evaluation, Technology assessment, Risk assessment, Waste disposal, Reprints, Thermal treatment.

PB94-169935/REB PC A03/MF A01
Empirical Comparisons of Carcinogen Potencies Across Species and Their Bearing on Appropriate Scaling of Doses for Risk Assessment. Book chapter.
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.
L. Rhomberg. c1994, 21p EPA/600/A-94/080, OHEA-C-494
Pub. in Water Contamination and Health, Integration of Exposure Assessment, Toxicology, and Risk Assessment, p425-441 1994. See also PB87-228557 and PB87-228565.

The chapter is adapted from the recent proposal by the Interagency Pharmacokinetics Group (IPG) advocating the adoption by the participating Federal regulatory agencies of a unified method of scaling daily administered amount of a carcinogenic agent in proportion to the 3/4 power of body weight. The dose-scaling approach was proposed as a default assumption, to be used when case-specific data are inadequate, to achieve presumed equal lifetime cancer risks in different mammalian species following lifetime exposure. In this chapter, the empirical investigations of how carcinogen potencies vary among species are reviewed and the implications for choice of a general risk assessment methodology for carcinogen dose scaling are discussed. The empirical data on comparative carcinogenic potencies in different species support the general practice of scaling rodent potencies to humans, and show that, on average, current methods perform rather well. The data are not of sufficient resolution, however, to distinguish between surface area and body weight dose scaling.

Keywords: *Carcinogens, *Toxicology, *Species diversity, *Dose-response relationships, Body weight, Mammals, Humans, Risk assessment, Potable water, Water pollutants, Reprints.

PB94-169943/REB PC A02/MF A01
Soil Fumigation within Monoculture and Rotations: Response of Response of Corn and Mycorrhizae. Journal article.
Robert S. Kerr Environmental Research Lab., Ada, OK.
M. D. Jawson, A. J. Franzluebbers, D. K. Galusha, and R. M. Aiken. c1994, 9p EPA/600/J-94/219
Pub. in Agronomy Jnl,, v85 n6 p1174-1180 Nov/Dec 93. Prepared in cooperation with Nebraska Univ.-Lincoln. Dept. of Agronomy.

The causative factors for corn (Zea mays L.) response to methyl bromide (CH3Br) fumigation, in the absence of known specific pathogens, are unknown. The study was conducted to determine if deleterious nonspecific rhizosphere microorganisms are the causitive agents. Soil fumigation was postulated to increase yield of continuous corn but to have less effect on the yield of corn grown in rotation, because more deleterious rhizosphere microorganisms were suspected in monoculture than in rotation. The effects of fumigation and crop rotation on corn grain yield, plant height and P content, available soil N and P, mycorrhizal infection, and soil microbial biomass were investigated at two sites near Mead, NE, on a Sharpsburg silty clay loam soil (fine, montmorillonitic, mesic Typic Argiudoll). Methyl bromide treatments were applied prior to planting for 4 yr at one site and 2 yr at the other site. The sites differed in fertilization, pest management, and crop sequences, but both contained continuous corn. Fumigation resulted in an increase in grain yield under monoculture only once in six site years. Unexpectedly, however, fumigation resulted in a decrease in grain yield under rotation in 7 or 12 observations. Plants in fumigated soil were P-deficient early in the growing season despite similar soil test P concentrations in control and fumigated plots. Fumigation reduced mycorrhizal infection and soil microbial biomass. Mycorrhizal infection of corn shortly after germination appears to be important to intitial corn growth in this soil. Fumigating soil revealed a considerable biological influence on corn growth and yield by reducing both deleterious and beneficial microorganisms.

Keywords: *Corn plants, *Response, *Microorganisms, *Pest control, Soils, Fumigation, Grain crops, Yield, Reduction, Phosphorus, Concentration(Compensation), Growth, Plant diseases, Reprint, *Crop rotation, *Mycorrhizae, Lincoln(Nebraska), Bromomethanes.

PB94-169950/REB PC A03/MF A01
Environmental Protection Agency, Narragansett, RI. Environmental Research Lab.
Fluorescence Assessment of the Maximum Quantum Efficiency of Photosynthesis in the Western North Atlantic. Journal article.
Delaware Univ., Lewes. Coll. of Marine Studies.
R. J. Geider, R. M. Greene, Z. Kolber, H. L. MacIntyre, and P. G. Falkowski. c1993, 21p EPA/600/J-94/220, , ERLN-X201

Contract DE-AC02-76CH00016, Grant NSF-OCE89-15084
Pub. in Deep-Sea Research I, v40 n6 p1205-1224, 1993. See also PB93-204923. Prepared in cooperation with Brookhaven National Lab., Upton, NY. Oceanographic and Atmospheric Sciences Div. Sponsored by Environmental Protection Agency, Narragansett, RI. Environmental Research Lab., Department of Energy, Washington, DC., and National Science Foundation, Arlington, VA.

The maximum quantum efficiency (phiII) of phytoplankton photosystem II photochemistry was assessed using a pump and probe fluorometer on an offshore-onshore transect from the oligotrophic blue waters of the western Sargasso Sea to the eutrophic waters of lower Delaware Bay. Low values of the ratio of variable to maximum fluorescence (Fv/Fm) of dark adapted samples provided evidence for reduced quantum efficiences in surface waters (z = 10 m) of the Sargasso Sea. In contrast, higher values of Fv/Fm in estuarine samples indicated near maximal phiII in lower Delaware Bay, with intermediate values of Fv/Fm observed over the continental shelf. Variations of Fv/Fm in surface samples (5 or 10 m depth) were associated with changes in hydrographic features that were consistent with the hypothesis that reduced values of phiII in Sargasso Sea surface waters were due to nutrient limitation of phytoplankton photosynthetic energy conversion.

Keywords: *Plant ecology, *Phytoplankton, *Fluorescence, *Photosynthesis, *Marine biology, Atlantic Ocean, Nutrients, Aquatic ecosystems, Quantum efficiency, Reprints.

PB94-169968/REB PC **A03**/MF **A01**
Amino Acid Composition of Suspended Particles, Sediment-Trap Material, and Benthic Sediment in the Potomac Estuary. Journal article.
Environmental Research Lab.-Narragansett, Newport, OR. Pacific Ecosystems Branch.
A. C. Sigleo, and D. J. Shultz. 1993, 13p EPA/600/J-94/221, ERLN-N207
Pub. in Estuaries, v16 n3A p405-415 1993. Prepared in cooperation with Geological Survey, Reston, VA.

Sediment trap deployments in estuaries provide a method for estimating the amount of organic material transported to the sediments from the euphotic zone. The amino acid composition of suspended particles, benthic sediment, and sediment-trap material collected at 2.4 m, 5.8 m, and 7.9 m depths in the Potomac Estuary was determined in stratified summer waters, and in well-mixed oxygenated waters (DO) in late fall. Analysis of the flux results suggest that resuspension combined with lateral advection from adjacent slopes can account up to 27% of the material in the deep traps when the estuary was well-mixed and unstratified. When the estuary was stratified in late summer, the amino acid carbon produced by primary productivity in the euphotic zone decreased by 85% (86% for total organic carbon) at the pycnocline at 6 m depth, leaving up to 15% of the vertical organic flux available for benthic sediment deposition.

Keywords: *Amino acids, *Organic matter, *Sediments, *Potomac Estuary, *Suspended solids, Dissolved oxygen, Euphotic zone, Benthos, Deposition(Sediments), Seasonal variations, Nitrogen cycle, Marine biology, Biochemistry, Sediment-water interfaces, Environmental transport, Carbon cycle, Reprints.

PB94-169976/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Episodic Acidification of Freshwater Systems in Canada: Physical and Geochemical Processes. Journal article.
University of East Anglia, Norwich (England). School of Environmental Sciences.
M. Tranter, T. D. Davies, P. J. Wigington, and K. N. Eshleman. c19 Jan 93, 23p EPA/600/J-94/222
Pub. in Water, Air, and Soil Pollution, v72 p19-39 1994. Prepared in cooperation with Bristol Univ. (England). Dept. of Geography. and Virginia Univ., Charlottesville. Dept. of Environmental Sciences. Sponsored by Corvallis Environmental Research Lab., OR.

The occurrence of episodic acidification in Canadian streams, lake waters and shallow groundwaters has been reviewed, and the controlling mechanisms identified. 'Episodes', which are periods of depressed alkalinity during hydrological events, have been studied mainly in southeastern Canada, and occur at all sites where there is sufficient time resolution of the observations, viz. Ontario, Quebec and Nova Scotia. An 'alkaline episode', where acidity decreases during an event, has been reported from one lake in the Canadian Arctic. There is a bias towards the examination of episodes stimulated by snowmelt or rain-on-snow, since rainfall-stimulated episodes are poorly documented. Pre-event, rather than event, water dominates runoff during episodes. For this reason, biogeochemical reactions and the hydrological flowpaths in operation through the vadose and saturated zones are the principal controls on the chemical characteristics of episodes. (Copyright (c) 1994 Kluwer Academic Publishers.)

Keywords: *Canada, *Fresh water, *Acidification, Water chemistry, Alkalinity, Acid neutralizing capacity, pH, Aquatic ecosystems, Surface waters, Ice, Acid rain, Snowmelt, Rainfall, Air water interactions, Hydrologic cycle, Watersheds, Reprints, Episodic acidification, Acidic deposition, Physical processes.

PB94-169984/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Using 'Found' Data to Augment a Probability Sample: Procedure and Case Study. Journal article.
California Univ., Los Angeles. Dept. of Biology.
J. M. C. Overton, T. C. Young, and W. S. Overton. cJul 92, 20p EPA/600/J-94/223
Pub. in Environmental Monitoring and Assessment, v26 p65-83 1993. See also PB88-170840 and PB94-160595. Prepared in cooperation with Clarkson Univ., Potsdam, NY. Dept. of Civil and Environmental Engineering. and Oregon State Univ., Corvallis. Dept. of Statistics. Sponsored by Corvallis Environmental Research Lab., OR.

While the probability sampling has the advantage of permitting unbiased population estimates, many past and existing monitoring schemes do not employ probability sampling. The authors describe and demonstrate a general procedure for augmenting an existing probability sample with data from nonprobability-based surveys ('found' data). The procedure uses sampling frame attributes to group the probability and found samples into similar subsets. Subsequently, the similarity is assumed to reflect the representativeness of the found sample for the matching subpopulation. Two methods of establishing similarity and producing estimates are described: pseudo-random and calibration. The pseudo-random method is used when the found sample can contribute additional information on variables already measured for the probability sample, thus increasing the effective sample size. The calibration method is used when the found sample contributes information that is unique to the found observations. For either approach, the found sample data yield observations that are treated as a probability sample, and population estimates are made according to a probability estimation protocol. To demonstrate these approaches, the authors applied them to found and probability samples of stream discharge data for the southeastern US.

Keywords: *Water quality, *Sampling, Population(Statistics), Probability theory, Estimates, Data bases, Mathematical models, Reprints.

PB94-169992/REB PC **A01**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Cement Stabilization/Solidification Techniques: pH Profile Within Acid-Attacked Waste Form. Journal article.
Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.
K. Y. Cheng, P. Bishop, and J. Isenburg. c1991, 4p EPA/600/J-94/224
Contract EPA-68-03-3379, Grant EPA-R-816700
Pub. in Waste Materials in Construction, p371-372 1991. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Leaching of cement-based waste form in acetic acid solutions has been investigated in this work. The examination of the pH profile along the acid penetration route by various pH colorimetric indicators is reported. A line of demarcation, believed to be the leaching boundary, was observed in every leached sample. (Copyright (c) 1991 Elsevier Science Publishers B.V.)

Keywords: *Waste forms, *Waste management, *Sludge disposal, *Cements, *Leaching, Stabilization, Solidification, Environmental transport, pH, Colorimetric analysis, Metals, Acetic acid, Reprints.

PB94-170008/REB PC **A02**/MF **A01**
Computer-Aided Data Acquisition for Combustion Experiments. Journal article Feb 88-Jun 92.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
P. M. Lemieux. Apr 93, 6p EPA/600/J-94/226
Pub in Scientific Computing and Automation, v9 n5 p89-92 Apr 93.

The article describes the use of computer-aided data acquisition techniques to aid the research program of the Combustion Research Branch (CRB) of the U.S. EPA's Air and Energy Engineering Research Laboratory (AEERL) in Research Triangle Park, NC, in particular on CRB's bench-scale rotary kiln incinerator simulator (RKIS) facility. CRB operates a combustion research laboratory to perform fundamental research examining phenomena associated with combustion-generated air pollution from a variety of processes, including the incineration of hazardous waste. This laboratory is permitted under the Resource Conservation and Recovery Act (RCRA) with a Research, Development and Demonstration permit, which allows a wide variety of experiments to be performed on real or surrogate hazardous waste materials. Ongoing research projects include studies examining trace metal aerosol formation, capture of toxic metals in a fluidized bed, and formation of products of incomplete combustion (PICs) from incineration processes.

Keywords: *Computer applications, *Data acquisition, *Combustion, *Air pollution monitoring, *Incinerators, Waste disposal, Hazardous wastes, Incineration, Toxic substances, Combustion efficiency, Continuous sampling, Kilns, Concentration(Composition), Experimental design, Reprints.

PB94-170016/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Greenhouse Gases from Biomass and Fossil Fuel Stoves in Developing Countries: A Manila Pilot Study. Journal article Nov 90-Jan 92.
East-West Environment and Policy Inst., Honolulu, HI.
K. R. Smith, M. A. K. Khalil, R. A. Rasmussen, S. A. Thorneloe, and F. Manegdeg. c1993, 29p EPA/600/J-94/229
Contract EPA-68-D9-0173
Pub in Chemosphere, v26 n1-4 p479-505 Jan/Feb 93. See also PB91-161687 and PB92-139369. Prepared in cooperation with Oregon Graduate Inst. of Science and Technology, Beaverton., Philippines Univ., Diliman, Quezon City. Coll. of Engineering., and Lawrence Berkeley Lab., CA. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

Samples were taken of the combustion gases released by household cookstoves in Manila, Philippines. In a total of 24 samples, 14 cookstoves were tested. These were fueled by liquefied petroleum gas (LPG), kerosene (three kinds of stoves), charcoal, and wood. Ambient samples were also taken. All samples were analyzed for CO2, CO, CH4, N2O, and total nonmethane organic compounds (TNMOC). Results generally confirm increasing emissions for most products of incomplete combustion moving down the 'energy ladder' from gaseous to liquid to processed solid to unprocessed solid fuels. When weighted by global warming potentials, the greenhouse impact of the emissions of non-CO2 greenhouse gases from wood combustion may rival or exceed those from CO2 alone. If verified, this could have substantial implications for energy and environmental policies in developing countries. These tentative findings indicate that more measurements of this type in developing countries would be justified.

Keywords: *Greenhouse gases, *Stoves, *Air pollution sampling, Reprints, Global warming, Combustion products, Developing countries, Philippines, Biomass, Fossil fuels, Non-methane hydrocarbons, Nitrogen oxide(N2O), Methane, Houses, Combustion efficiency, Emission factors, Carbon monoxide, Carbon dioxide, *Manila(Philippines), Small systems.

PB94-170024/REB PC A03/MF A01
Effects of NO3(-), Cl(-), F(-), SO4(2-), and CO3(2-) on Pb(2+) Immobilization by Hydroxyapatite. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Q. Y. Ma, T. J. Logan, S. J. Traina, and J. A. Ryan.
c1994, 13p EPA/600/J-94/230
Pub. in Environmental Science and Technology, v28 n3 p408-418 1994,. Prepared in cooperation with Ohio State Univ., Columbus. Dept. of Agronomy.

Remediation of Pb-contaminated wastes has received considerable attention recently. We have previously shown that hydroxyapatite (Ca5(PO4)3OH) can reduce Pb(2+) concentrations below the EPA action level (72.4nmol/L) and, thus, has the potential for in situ Pb(2+) immobilization against leaching. This research investigated the effects of NO3(-1), Cl(-1), F(-1), SO4(-2), and CO3(-2) on hydroxyapatite-Pb(2+) interactions. (Copyright (c) 1994 by the American Chemical Society.)

Keywords: *Waste management, *Land pollution control, *Lead(Metal), *Remedial action, Waste disposal, Soil contamination, Water pollution control, Earth fills, Ions, Reprints, *Apatite/hydroxy, Cleanup operations.

PB94-170032/REB PC A02/MF A01
Environmental Monitoring Systems Lab., Las Vegas, NV.
Development of a Battery-Operated Portable Synchronous Luminescence Spectrofluorometer. Journal article.
Oak Ridge National Lab., TN.
J. P. Alarie, V. D. Tuan, G. Miller, M. N. Ericson, and S. R. Maddox. c1993, 8p EPA/600/J-94/231
Contract EPA-68-CO-0049
Also pub. in Sci. Instrument. v64 n9 p2541-2546 Sep 93. Prepared in cooperation with Lockheed Environmental Systems and Technologies Co., Las Vegas, NV. Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

A battery-operated portable synchronous luminescence spectrofluorometer was developed for on-site analysis of groundwater or hazardous waste sites. The instrument is capable of either emission, excitation, or synchronous fluorescence measurements. The instrument is suited for trace analysis of important pollutants such as polyaromatic hydrocarbons, creosotes, and polychlorinated biphenyls in complex mixtures. The ability to perform synchronous luminescence measurements on these samples can reduce the complexity of fluorescence spectra and help in rapid field site characterization. A description of the instrumental components is given and an evaluation of the instrument using anthracene and several oil samples is provided to illustrate the usefulness of the instrument. (Copyright (c) 1993 American Institute of Physics.)

Keywords: *Portable equipment, *Spectrochemical analysis, *Water pollution detection, *Soil analysis, *Hazardous wastes, Land pollution, Chemical analysis, On-line measurement systems, Chemiluminescence, Site characterization, Performance evaluation, Design criteria, Fluorometers, Reprints, *Synchronous luminescence monitors.

PB94-170040/REB PC A02/MF A01
Environmental Research Lab., Narragansett, RI.
Polychlorinated Biphenyl Congener Distributions in Winter Flounder as Related to Gender, Spawning Site, and Congener Metabolism. Journal article.
Woods Hole Oceanographic Institution, MA. Dept. of Biology.
A. A. Elskus, J. J. Stegeman, J. W. Gooch, D. E. Black, and R. J. Pruell. c1994, 9p EPA/600/J-94/232, , ERLN-1391
Grant EPA-R-813155
Pub. in Environmental Science and Technology, v28 n3 p401-407 1994. Sponsored by Environmental Research Lab., Narragansett, RI.

Concentrations of 17 polychlorinated biphenyl (PCB) congeners were measured in liver of gonadally mature winter flounder collected from Fox Island and Gaspee Point, RI, and from New Bedford Harbor, MA. These locations represent spawning sites with different degrees and sources of PCB contamination. The data demonstrate that the PCB concentrations and patterns in these fish reflect those of their spawning grounds, indicating that winter flounder caught in clean offshore waters could have substantial amounts of tissue PCB, that the content of PCB congeners in winter flounder liver is influenced little by sex or reproductive condition, and that flounder selectively metabolize PCB congeners with adjacent meta,para-unsubstituted carbon atoms. (Copyright (c) 1994 American Chemical Society.)

Keywords: *Flounder, *Polychlorobiphenyl compounds, *Water pollution effects(Animals), *Reproduction(Biology), Liver, Toxicity, Sex factors, Tissue distribution, Metabolism, Fishes, Reprints.

PB94-170057/REB PC A03/MF A01
Environmental Research Lab., Gulf Breeze, FL. Office of Research and Development.
Bacterial Growth Efficiency on Natural Dissolved Organic Matter. Journal article.
Technical Resources, Inc., Gulf Breeze, FL.
N. Kroer. c1993, 11p EPA/600/J-94/233
Pub. in Limnology and Oceanography, v38 n6 p1282-1290 1993. Sponsored by Environmental Research Lab., Gulf Breeze, FL. Office of Research and Development.

Bacterial growth efficiency was examined in batch cultures and continuous flow cultures. Natural assemblages of pelagic bacteria were inoculated into particle free water and growth efficiencies determined from measurements of produced particulate organic carbon (POC) and utilized dissolved organic carbon (DOC). On the average, 6% of the DOC was consumed during growth in batch cultures. Depending on the sampling locality, consumed DOC was converted to bacterial biomass with efficiencies ranging from 24% to 59%. The efficiency did not correlate with either concentration or consumption of DOC.

Keywords: *Marine biology, *Bacteria, *Growth, *Organic matter, *Aquatic ecosystems, Nitrogen, Ammonium compounds, Nutrients, Coastal ecology, Pelagic zone, Reprints.

PB94-170065/REB PC A04/MF A01
Utilization of Topsmelt, 'Atherinops affinis', in Environmental Toxicology Studies along the Pacific Coast of the United States. Journal article.
Environmental Research Lab., Gulf Breeze, FL. Office of Research and Development.
D. P. Middaugh, and B. S. Anderson. c1993, 51p EPA/600/J-94/234
Pub. in Reviews of Environmental Toxicology, v5 p1-49 1993. Prepared in cooperation with California Univ., Santa Cruz. Inst. of Marine Sciences.

This review provides a synopsis of information available on the geographical distribution, identification, natural history and reproductive habits of the topsmelt, Atherinops affinis. We also review and report on procedures for laboratory spawning of adult topsmelt, culturing of the early-life stages including embryos and larvae, and conducting several different toxicity tests with early-life stages. The toxicological protocols were developed as part of a continuing effort by the U.S. Environmental Protection Agency and the California Water Resources Control Board to provide toxicity testing protocols for indigenous indicator fishes that can be used in pollution research and effluent monitoring programs in the Pacific coastal region of the United States.

Keywords: *Biological indicators, *Fishes, *Environmental monitoring, *Toxicity, Bioaccumulation, Bioindicators, Indicator species, Life cycle, Water pollution effects(Animals), Pesticide residues, Copper, Tables(Data), Reprints, *Smelt, *Atherinops affinis, Pacific Coast(United States).

PB94-170073/REB PC A03/MF A01
Environmental Research Lab., Gulf Breeze, FL. Office of Research and Development.
Trophic Transfer of Contaminants from Organisms Living by Chromated-Copper-Arsenate (CCA)-Treated Wood to Their Predators. Journal article.
Rutgers - The State Univ., Newark, NJ. Dept. of Biological Sciences.
J. S. Weis, and P. Weis. c1993, 12p EPA/600/J-94/235
Also pub. as Environmental Research Lab., Gulf Breeze, FL. rept. no. GULF BREEZE CONTRIB-799. Pub. in Jnl. of Experimental Marine Biology and Ecology, v168 p25-34 1993. See also PB94-140662. Prepared in cooperation with University of Medicine and Dentistry of New Jersey, Newark. Dept. of Anatomy. Sponsored by Environmental Research Lab., Gulf Breeze, FL. Office of Research and Development.

Oysters, Crassostrea virginica (Gmelin), collected from a residential canal lined with wood treated with chromated copper arsenate (CCA) has elevated levels of the metals in their tissues. Carnivorous snail, Thais haemastoma floridana (Conrad), fed the oysters gradually ate less than snails fed reference oysters, and grew less over an eight-week period. Snails that ate canal oysters increased their body burden of copper about 4-fold over 8 weeks; their tissue concentrations were comparable to field-collected snails gathered from a CCA bulkhead in open water. Thais specimens were not found within a canal. Juvenile fish (Leiostomus xanthurus Lacepede and Lagodon rhomboides Linn.) were fed worms (primary Neanthes succinea Frey and Leuckart) collected from sediments adjacent to a CCA bulkhead facing open water. The worms had elevated concentrations of the metals compared to worms from a reference site.

Keywords: *Wood preservatives, *Pesticides, *Water pollution effects(Animals), *Toxic hazards, Chromium, Arsenic, Copper, Fungicides, Fishes, Bioaccumulation, Wood products, Snails, Lumber, Heavy metals, Oysters, Reprints, Crassostrea virginica, Thais (Stramonita) haemastoma floridana, Leiostomus xanthurus, Lagodon rhomboides, Neanthes succinea.

PB94-170081/REB PC A02/MF A01
Environmental Protection Agency, Gulf Breeze, FL. Gulf Breeze Environmental Research Lab.
Phylogenetic Analysis of a Bacterial Aerobic Degrader of Azo Dyes. Journal article.
Cincinnati Univ. Medical Center, OH. Dept. of Molecular Genetics, Biochemistry and Microbiology.
M. Govindaswami, T. M. Schmidt, D. C. White, and J. C. Loper. c1993, 7p EPA/600/J-94/236
Pub. in Jnl. of Bacteriology, v175 n18 p6062-6066 Sep 93. Prepared in cooperation with Miami Univ., Oxford, OH. Dept. of Microbiology. and Tennessee Univ., Knoxville. Center for Environmental Biotechnology. Sponsored by Environmental Protection Agency, Gulf Breeze, FL. Gulf Breeze Environmental Research Lab.

Eubacterial consensus obligonucleotide primers were used to amplify by polymerase chain reaction the nearly full-length 16S rRNA gene of isolate C7, a gram-negative rod capable of aerobic degradation of azo dyes. The DNA product was cloned and sequenced. Phylogenetic analysis based upon this DNA sequence places C7 within the alpha subdivision of proteobacteria, most closely related to Caulobacter subvibrioides. The phospholipid fatty acid pattern resembles that of caulobacters, with monounsaturated 16- and 18-carbon fatty acids predominating. C7 is unusual in having a monounsaturated branched fatty acid in the phospholipids and exclusively 2-hydroxy fatty acids in the lipid-extracted residue. This organism is of potential use in bioreactors operated for azo dye degradation. (Copyright (c) 1993, American Society for Microbiology.)

Keywords: *Azo dyes, *Biodeterioration, *Aerobic bacteria, *Phylogeny, Ribosomal RNA, Molecular cloning, Polymerase chain reaction, DNA sequence analysis, Fatty acids. Reprints, Caulobacter subvibrioides.

PB94-170099/REB PC A02/MF A01
Air Quality Data Analysis System for Interrelating Effects, Standards, and Needed Source Reductions: Part 12. Effects on Man, Animals, and Plants as a Function of Air Pollutant Impact. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
R. I. Larsen, W. F. McDonnell, D. L. Coffin, and W. W. Heck. Dec 93, 10p EPA/600/J-94/239
Pub. in Jnl. of Air and Waste Management Association, v43 p1585-1592 Dec 93. See also Part 11, PB91-200287. Prepared in cooperation with Department of Agriculture, Raleigh, NC.

The impact-effect mathematical model was developed previously to predict biological response as a function of air pollutant impact (exposure duration multiplied by pollutant concentration raised on an exponent). The purpose of this paper is plot and regress example effects on man, animals, and plants (a wide range of life

forms) as a function of air pollutant impact to determine how well the plotted data fit this model and to determine, especially, how well both acute and chronic exposure data fit the model. The three examples of air pollutant effects plotted and regressed are: for man, lung function decrease after exposure to ozone (O3); for animals, mice mortality after exposure to nitrogen dioxide (NO2); and for plants, leaf injury after exposure to O3. The resultant impact-effect equations explain 95 percent of the variance for the lung function data, 92 percent for leaf injury, and 73 percent for mice mortality.

Keywords: *Air quality, *Air pollution effects, *Biological effects, *Regression analysis, Exposure, Public health, Animals, Plants(Botany), Mortality, Leaves(Botany), Nitrogen dioxide, Ozone, Mice, Mathematical models, Field tests, Reprints.

PB94-170107/REB PC **A01/MF A01**
Fine-Particle Sodium Tracer for Long-Range Transport of the Kuwaiti Oil-Fire Smoke. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
D. H. Lowenthal, R. D. Borys, C. F. Rogers, J. C. Chow, and R. K. Stevens. c23 Apr 93, 5p EPA/600/J-94/238
Pub. in Geophysical Research Letters, v20 n8 p691-693, 23 Apr 93. See also PB92-206481. Prepared in cooperation with Nevada Univ. System, Reno. Desert Research Inst. and Maryland Univ., College Park. Dept. of Chemistry.

Evidence for long-range transport of the Kuwaiti oil-fire smoke during the months following the Persian Gulf War has been more or less indirect. However, more-recent data on the aerosol chemistry of Kuwaiti oil-fire plumes provides a direct link between those fires and aerosols collected at the Mauna Loa Observatory (MLO) during the late spring and summer of 1991. By itself, temporal covariation of fine-particle concentrations of elemental carbon, sulfur, and the noncrustal V/Zn ratio in MLO aerosols suggested a link to large-scale oil-combustion sources, but not necessarily to Kuwait. However, high concentrations of fine-particle (0.1-1.0 microm diameter) NaCl were observed in the 'white' oil-fire plumes over Kuwait during the summer of 1991. In the absence of other demonstratable sources of fine-particle Na, these relationships provide a direct link between the Kuwaiti oil-fires and aerosol composition observed at MLO. (Copyright (c) 1993 American Geophysical Union.)

Keywords: *Fires, *Sodium, *Tracer techniques, *Environmental transport, *Air pollution, *Kuwait, *Oil wells, Aerosols, Sodium chloride, Smoke, Air pollution monitoring, Atmospheric composition, Path of pollutants, Climate models, Vanadium, Zinc, Diagnostic techniques, Combustion products, Covariance, Plumes, Forecasting, Reprints, MLO(Mauna Loa Observatory).

PB94-170115/REB PC **A03/MF A01**
Analysis of Selected Chemical Groups by Liquid Chromatography/Mass Spectrometry. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
K. J. Krost. 1993, 11p EPA/600/J-94/240
Pub. in Applied Spectroscopy, v47 n6, 1993.

The use of a moving-belt liquid chromatography/mass spectrometry interface for identifying selected members of various chemical classes has been investigated. Among the chemical groups examined with this system were benzidines, nitrosoamines, anilines, nitroaromatics, dinitroaromatics, hydrazines, amides, phenylenediamines, organophosphites, acrylates, pyridines, phthalates, nitrophenols, halogenated triazines, pesticides, halogenated pyridines, and alkyl tins. Selective ion monitoring was used for detection in all cases, in view of the lack of sensitivity in the full-scan mode. The lower limit of detection for the present technique is approximately 10 nanograms of compounds. Presumably, some lower-molecular-weight compounds within given groups exhibit similar behavior because of volatilization losses in the inlet. (Copyright (c) 1993 Society for Applied Spectroscopy.)

Keywords: *Mass spectroscopy, *Liquid column chromatography, *Organic nitrogen compounds, Quantitative chemical analysis, Ion detection, Limits, Spectrum analysis, Spectral response, Performance evaluation, Sensitivity, Mass, Volatility, Pesticides, Halohydrocarbons, Pyridines, Triazines, Tin compounds, Nitrosoamines, Nitrophenol, Phthalates, Acrylates, Amides, Aniline, Benzidine, Hydrazines, Phosphorous acid, Phenylenediamines, Reprints, Specificity, *HPLC/MS(High Performance Liquid Chromatography/Mass Spectroscopy).

PB94-170123/REB PC **A03/MF A01**
Comparison of Nonmethane Organic Compound Concentration Data Collected by Two Methods in Atlanta. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
J. H. Shreffler. Dec 93, 11p EPA/600/J-94/241
Pub. in Jnl. of Air and Waste Management Association, V43 p1576-1584, Dec 93.

Title I of the Clean Air Act Amendments of 1990 calls for 'enhanced monitoring' of ozone, which is planned to include measurements of atmospheric non-methane organic compounds (NMOCs). NMOC concentration data gathered by two methods in Atlanta, Georgia during July and August 1990 are compared in order to assess the reliability of such measurements in an operational setting. During that period, automated gas chromatography (GC) systems (Field systems) were used to collect NMOC continuously as one-hour averages. In addition, canister samples of ambient air were collected on an intermittent schedule for quality control purposes and analyzed by laboratory GC (the Lab system). Data from the six-site network included concentrations of nitrogen oxides (NOx), carbon monoxide (CO), ozone, total NMOC (TNMOVC), and 47 identified NMOCs. (Copyright (c) 1993-Air & Waste Management Association.)

Keywords: *Non-methane hydrocarbons, *Air pollution monitoring, Comparison, Ozone, Concentration(Composition), Clean Air Acts, Gas chromatography, Field tests, Experimental design, Quality control, Georgia, Reprints, Atlanta(Georgia).

PB94-170131/REB PC **A03/MF A01**
Evaluating Two Objective Techniques to Define Pools in Small Streams. Symposium paper.
Oregon State Univ., Corvallis.
E. G. Robison, and P. R. Kaufmann. Jun 93, 12p EPA/600/A-94/071
Pub. in Proceedings of Annual Summer Symposium, American Water Resources Association, Jackson Hole, WY., June 26-29, 1993. Prepared in cooperation with Corvallis Environmental Research Lab., OR.

Human induced changes on stream morphology and fish habitat in wadable streams are often difficult to detect. This detection is often hampered by using non-quantitative techniques to describe morphology. To aid in monitoring changes in the size and longitudinal pattern of pools along streams, the residual pool concept was developed in the 1980s. This paper evaluates two variations of a rapid field technique that quantifies residual pools. The techniques require only an overall reach slope estimate with measures of thalweg depth and wetted width at short intervals of longitudinal distance. The authors evaluated the technique on 27 stream reaches in Willamette Valley, Coast Range, and Cascade Mountains of Western Oregon, U.S.A. Residual pools in these streams were quantified using both a rapid and a more rigorous method.

Keywords: *Habitats, *Fishes, *Ponds, *Streams, Channels, Animal ecology, Surface waters, Morphology, Graphs(Charts), Oregon, Pools.

PB94-170230/REB PC **A05/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Emerging Technology Report: Cross-Flow Pervaporation System for Removal of VOC's from Contaminated Wastewater. Final rept.
Environmental Protection Service, Burlington (Ontario). Waste Water Technology Centre.
P. Cote, C. Lipski, and H. Campbell. May 94, 83p EPA/540/R-94/512
Grant EPA-R-815788-02
See also PB88-106166. Prepared in cooperation with Zenon Environmental, Inc., Burlington (Ontario). Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Water contaminated with volatile organic compounds is encountered throughout industry and in many groundwater and site remediation applications. Previous work has demonstrated that pervaporation is a potentially suitable remediation method for such applications. The primary objectives of this project have been to develop an improved membrane and module design to make pervaporation a more cost-effective method of removing volatile organic compounds from contaminated water, and to compare the improved pervaporation module and membrane design to other remediation technologies as well as other pervaporation module and membrane designs for the removal of organics from contaminated water. Optimization indicated that pervaporation operation with transverse flow modules would be most effective using thick membranes at higher Reynolds Numbers and higher operating temperatures.

Keywords: *Water pollution control, *Hazardous materials, *Waste water treatment, *Membranes, Organic compounds, Cross flow, Superfund, Polymeric films, Vacuum filtration, Prototypes, Toluene, Performance evaluation, Case studies, Cost engineering, VOCs(Volatile organic compounds), Pervaporation.

PB94-170263/REB PC **A03/MF A01**
Feasibility of Using Satellite Derived Data to Infer Surface-Layer Ozone Concentration Patterns. Project rept.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
B. K. Eder. May 94, 49p EPA/600/R-94/081
See also PB90-130451. Prepared in cooperation with National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Lab.

The purpose of the study was to determine, through the utilization of a multivariate statistical technique called Principal Component Analysis (PCA), whether ozone measurements derived from satellites could be used to infer surface-layer concentrations. Examination of the spatial and temporal characteristics associated with the first nonrotated principal components (which are the dominant components, explaining 37.95 and 41.25% of the total variance of the surface and satellite data sets, respectively) revealed considerable coherence between the data sets suggesting that on continental-scales, seasonal O3 patterns derived from the satellite data replicate, quite well, those of the surface. This coherence diminishes, however, when daily patterns are compared. Upon orthogonal rotation, the PCA delineated four contiguous and statistically unique subregions with each data set (the Northwest, Northeast, Southwest and Southeast) that were similar, suggesting that the satellite data may be able to discern O3 patterns on spatial scales as small as 1000 km.

Keywords: *Ozone, *Air pollution detection, *Satellite observation, North America, Air pollution monitoring, Remote sensing, Spatial distribution, Principal components analysis, Regional analysis, Temporal distribution, Feasibility studies, Surface ozone concentration.

PB94-170297/REB PC **A04/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Test Method for the Measurement of Methanol Emissions from Stationary Sources. Journal article.
Research Triangle Inst., Research Triangle Park, NC.
B. A. Pate, M. R. Peterson, E. E. Rickman, and R. K. M. Jayanty. May 94, 74p EPA/600/R-94/080
Contract EPA-68-D1-0009
See also PB93-222230. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Methanol was designated under Title III of the Clean Air Act Amendments of 1990 as a pollutant to be regulated. A test method has been developed for the measurement of methanol emissions from stationary sources. The methanol sampling train (MST) consists of a glass-lined heated probe, two condensate knockout traps, and three sorbent cartridges packed with Anasorb 747. The Anasorb samples were desorbed with a 1:1 mixture of carbon disulfide and N,N-dimethylformamide. All samples were analyzed by gas chromatography with flame ionization detection. Following laboratory testing, field tests of the MST and the National Council of the Paper Industry for Air and Stream

Improvement (NCASI) sampling method for methanol were conducted at two pulp and paper mills. In accordance with EPA Method 301, two pairs of trains were run in parallel for six runs, collecting a total of 24 samples by each method. During each run, half of the trains were spiked with a known amount of methanol. The sampling location at the first test was an inlet vent to a softwood bleach plant scrubber where the methanol concentration was about 30 ppm. A second field test was conducted at the vent of a black liquor oxidation tank where the methanol concentration was about 350 ppm. Samples were shown to be stable for at least 2 weeks after collection.

Keywords: *Methanol, *Emissions, *Air pollution control, *Pulp mills, Flue gases, Paper mills, Test methods, Stationary sources, Field tests, Chemical analysis, Air sampling, Waste processing, Performance evaluation, Quality control, Bias, Scrubbers, Vents, Sorbents, Clean Air Act Amendments of 1990.

PB94-170313/REB PC A99/MF E11
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition. Final Update 1.
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
15 Nov 92, 1106p EPA/530/SW-846.31
Supersedes PB89-148076. See also Proposed Update II, PB94-170321.

This document updates test procedures and guidance recommended for conducting evaluations and measurements needed to comply with Subtitle C of the Resource Conservation and Recovery Act (RCRA). Details methods approved by EPA for obtaining data to satisfy requirements. Replaces the current second edition by its incorporation by reference (along with the basic volumes) into the code of federal regulations.

Keywords: *Solid wastes, *Sampling, *Test methods, Manuals, Chemical analysis, Evaluation, Standards, Hazardous materials, Collecting methods, Chemical composition, Path of pollutants, Quality control, Regulations, Metals, Spectroscopic analysis, Organic compounds, Toxicity, Ground water, Sludge, Ignition, Resource recovery acts, *RCRA(Resource Conservation and Recovery Act).

PB94-170321/REB PC A99/MF E16
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition. Proposed Update II.
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
15 Nov 92, 1346p EPA/530/SW-846.32
See also Final Update I, PB94-170313.

This document updates test procedures and guidance recommended for conducting evaluations and measurements needed to comply with Subtitle C of the Resource Conservation and Recovery Act. Proposes revisions to several methods in the third edition of SW-846. Recommends several new methods that allow more flexibility of method selection. Provides methods for additional analytes.

Keywords: *Solid wastes, *Sampling, *Test methods, Manuals, Chemical analysis, Evaluation, Standards, Hazardous materials, Collecting methods, Chemical composition, Path of pollutants, Quality control, Metals, Ground water, Regulations, Organic compounds, Spectroscopic analysis, Ignition, Toxicity, Sludge, Resource recovery acts, *RCRA(Resource Conservation and Recovery Act).

PB94-170388/REB PC A14/MF A03
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Evaluation of Asbestos Management Programs in 17 New Jersey Schools: A Case Studies Report.
Environmental Quality Management, Inc., Cincinnati, OH.
J.R. Kominsky, R. W. Freyberg, C. S. Hubert, J. A. Brownlee, and D. R. Gerber. May 94, 318p EPA/600/R-94/084
Contract EPA-68-D2-0058
Prepared in cooperation with New Jersey State Dept. of Health, Trenton. Environmental Health Service. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

From 1988 through 1992, the U.S. Environmental Protection Agency's Risk Reduction Engineering Laboratory (EPA-RREL) and the New Jersey Department of Health's Environmental Health Service (NJDOH-EHS) conducted studies in 17 schools in New Jersey to evaluate their asbestos management programs. Findings of a study conducted in 1988 to document Asbestos Hazard Emergency Response Act (AHERA) final clearance concentrations of asbestos at these 17 schools prompted a followup study in 1990 to determine the airborne asbestos concentrations 2 years after the abatement efforts. In 1992, EPA/NJDOH conducted a final study at the 17 schools to measure airborne asbestos levels during actual occupied conditions 4 years after abatement. The report presents the results of the 1992 study and integrates the results of the three previous studies to evaluate the asbestos management programs in these schools. It also presents case histories of each study site that summarize the findings of the 1988, 1990, 1991, and 1992 studies.

Keywords: *Asbestos, *School buildings, *Air pollution sampling, Indoor air pollution, Transmission electron microscopy, Particles, Fibers, Level(Quantity), Concentration(Composition), Inspection, Air pollution control, Environmental surveys, New Jersey.

PB94-171659/REB PC A07/MF A02
Environmental Research Lab., Narragansett, RI.
Statistical Summary: EMAP-Estuaries. Virginian Province, 1991.
Science Applications International Corp., Narragansett, RI.
S. C. Schimmel, B. D. Melzian, D. Campbell, C. J. Strobel, and S. J. Benyi. Mar 94, 147p EPA/620/A-94/005, , ERLN-1455
Contracts EPA-68-C1-0005, EPA-68-01-7365
See also PB93-229854. Prepared in cooperation with Computer Sciences Corp., Falls Church, VA. and Rhode Island Univ., Kingston. Graduate School of Oceanography. Sponsored by Environmental Research Lab., Narragansett, RI.

Annual monitoring of indicators of the ecological condition of bays and estuaries within the Virginian Province (Cape Code, MA to Cape Henry, VA) was conducted by the U.S. EPA's Environmental Monitoring and Assessment Program (EMPA) during July, August, and September, 1991. Data were collected at 154 stations within the Province. Indicators monitored included water quality (temperature, salinity, water clarity, and dissolved oxygen concentration), sediment contamination, sediment toxicity, benthic community structure, fish community structure, fish gross external pathology, and fish tissue contamination. Data are used to estimate the current status of the ecological condition of Virginian Province estuarine resources, and provide a baseline for identifying future trends. Cumulative distribution functions (CDFs) and bar charts are utilized to graphically display data. Estimates, with 95% confidence intervals, are provided of the areal extent of degraded resources within the Province for those indicators where 'degradation' can be defined. Data are also presented by estuarine class: Large estuaries, small estuarine systems, and large tidal rivers. Included, as an appendix, are sub-population estimates for Chesapeake Bay and Long Island Sound.

Keywords: *Estuaries, *Water pollution effects, Chesapeake Bay, Cape Cod, Bioindicators, Toxicity, Environmental effects, Risk assessment, Bioaccumulation, Benthos, Regional analysis, Sediments, Dissolved oxygen, *Middle Atlantic Region(United States), EMAP(Environmental Monitoring and Assessment Program).

PB94-171865/REB PC A03/MF A01
Exhaust Emission Testing of Two Ethanol Variable Fueled 1992 Chevrolet Luminas. Test Results - 1993. Technical rept.
Environmental Protection Agency, Ann Arbor, MI. Engine and Vehicle Regulation Branch.
M. Samulski. 1994, 36p EPA/AA/EVRB-94/01

The report describes the exhaust emission testing results for two 1992 low-mileage Chevrolet Lumina ethanol variable fuel vehicles. The vehicles were tested on both Indolene and E85 fuel using the Federal Test Procedure (FTP) for exhaust emissions. In the future, the EPA will retest the Luminas at future mileage accumulations of 20,000, 50,000 and possibly 100,000. At these future mileage accumulations, the vehicles will also be tested using intermediate fuel blends for both exhaust and evaporative emissions.

Keywords: *Exhaust emissions, *Ethanol fuels, Air pollution, Combustion products, Alternative fuels, Tests, Motor vehicles, 1992 Chevrolet Lumina, Indolene.

PB94-171907/REB PC A07/MF A02
Reregistration Eligibility Decision (RED): 2-((Hydroxy-Methyl)Amino)ethanol.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Dec 93, 147p EPA/738/R-93/028

This document presents the Agency's decision regarding the reregistration eligibility of the registered uses of 2-((Hydroxymethyl)amino)ethanol. The document consists of six sections. Section I is the introduction. Section II describes 2-((Hydroxymethyl)amino)ethanol, it uses, data requirements and regulatory history. Section III discusses the human health and environmental assessment based on the data available to the Agency. Section IV presents the Agency's decision. Section V discusses reregistration requirements. Finally, Section VI is the Appendices which support this Reregistration Eligibility Decision.

Keywords: *Pesticides, Fungicides, Ethanols, Toxicity, Risk assessment, Humans, Animals, Exposure, Chemical properties, Environmental impacts, Pollution regulations, Administrative procedures, Requirements, *Ethanol/2-((hydroxymethyl)amino), *Reregistration, Bacteriostats, Use patterns, CAS 34375-28-5.

PB94-172806 Not available NTIS
Environmental Protection Agency, Washington, DC.
Current Activities Within the National Biomonitoring Specimen Bank. Final rept.
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD.
S. A. Wise, B. Koster, J. Langland, and R. Zeisler.
1993, 12p
Pub. in The Science of the Total Environment 139/140, p1-12 1993. Sponsored by Environmental Protection Agency, Washington, DC., National Oceanic and Atmospheric Administration, Rockville, MD., and Department of the Interior, Washington, DC.

The National Institute of Standards and Technology (NIST) has been involved in biological environmental specimen banking activities since 1979. These activities, which are known collectively as the National Biomonitoring Specimen Bank (NBSB), include the banking of a variety of specimens (human liver, sediment, mussels/oysters, fish tissue and marine mammal tissues) from several different projects supported by different government agencies. The two most recent projects, the Alaska Marine Mammal Tissue Archival Project (AMMTAP) and the National Marine Mammal Tissue Bank (NMMTB), focus on the collection, banking and analysis of marine mammal tissues and they are part of a comprehensive plan to address marine mammal monitoring, specimen banking and quality assurance of analytical measurements associated with contaminant analyses in marine mammals.

Keywords: *Tissue banks, *Bioaccumulation, *Marine mammals, *Water pollution effects(Animals), Pollution monitoring, Biological accumulation, Data collection, Environmental monitoring, Terrestrial ecosystems, Specimens, Organic compounds, Contamination, Quality assurance, Reprints.

PB94-173093/REB PC A14/MF A03
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Locating and Estimating Air Emissions from Sources of Cadmium and Cadmium Compounds. Final rept.
Midwest Research Inst., Cary, NC.
R. Jones, T. Lapp, and D. Wallace. Sep 93, 312p EPA/454/R-93/040
Contract EPA-68-D2-0159
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The document deals with cadmium and cadmium compounds; however, the majority of the information contained in this document concerns cadmium. Sources of cadmium emissions evaluated in this document include: (1) cadmium production and uses processes; (2) emissions from combustion sources; (3) production of other nonferrous metals where cadmium emissions result as inadvertent byproducts of the process; (4)

production processes for selected materials other than nonferrous metals; and (5) mobile sources. Data presented in this document are total cadmium emissions and do not differentiate the metallic and ionic forms of cadmium.

Keywords: *Cadmium, *Air pollution monitoring, *Exhaust emissions, Cadmium compounds, Incineration, Combustion products, Electroplating, Batteries, Smelting, Refining, Air pollution sources, Manufacturing, Industrial plants, Steel making, Industrial wastes, Toxic substances, Stabilizers, Emission inventories.

PB94-173101/REB PC **A14/MF A03**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Locating and Estimating Air Emissions from Sources of Mercury and Mercury Compounds. Final rept.
Midwest Research Inst., Cary, NC.
R. Jones, T. Lapp, and D. Wallace. Sep 93, 303p EPA/454/R-93/023
Contract EPA-68-D2-0159
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The purpose of the document is to assist Federal, State, and local air pollution agencies and others who are interested in locating potential air emitters of mercury and mercury compounds and estimating air emissions from these sources. Section 3 of the document provides a brief summary of the physical and chemical characteristics of mercury and mercury compounds and an overview of their production and uses. Section 4 to 7 of the document focus on the major industrial source categories that may discharge mercury-containing air emissions. Section 8 discusses emissions from miscellaneous fugitive and area sources. Section 9 of the document summarizes available procedures for source sampling and analysis of mercury.

Keywords: *Mercury(Metal), *Air pollution monitoring, *Exhaust emissions, Mercury compounds, Combustion products, Incinerators, Industrial plants, Power generation, Chemical industry, Manufacturing, Agricultural chemicals, Air pollution sources, Toxic substances, Emission inventories.

PB94-173119/REB PC **E99/MF E99**
Air Quality Criteria for Ozone and Related Photochemical Oxidants.
Environmental Protection Agency, Research Triangle Park, NC. Environmental Criteria and Assessment Office.
1993, 1620p 1620p-in 4v*
Set includes PB94-173127 through PB94-173150. See also PB87-142956 and PB92-235670.

No abstract available.

PB94-173127/REB PC **A20/MF A04**
Air Quality Criteria for Ozone and Related Photochemical Oxidants. Volume 1 of 3. Review draft.
Environmental Protection Agency, Research Triangle Park, NC. Environmental Criteria and Assessment Office.
Dec 93, 460p* EPA/600/AP-93/004A
See also PB87-142956 and Volume 2, PB94-173135.
Also available in set of 4 reports, PC E99/MF E99, PB94-173119.

The photochemical oxidants found in ambient air in the highest concentrations are ozone (O3) and nitrogen dioxide (NO2). The document focuses primarily on the scientific air quality criteria for O3 criteria and, to a lesser extent, for hydrogen peroxide and the peroxyacyl nitrates, particularly peroxyacetyl nitrate. The purpose of this document is to summarize the air quality criteria O3 available in the published literature through the end of 1993. This review was performed in accordance with provisions of the Clean Air Act (CAA) to provide the scientific basis for periodic reevaluation of the O3 NAAQS.

Keywords: *Ozone, *Photochemical reactions, *Atmospheric chemistry, Oxidants, Photochemistry, Precursors, Air pollution, Hydrogen peroxide, Peroxyacetyl nitrate, Environmental transport, Meteorological data, Mathematical models, Public health, Risk assessment, NAAQS(National Ambient Air Quality Standards), Volatile organic compounds.

PB94-173135/REB PC **A19/MF A04**
Air Quality Criteria for Ozone and Related Photochemical Oxidants. Volume 2 of 3. Review draft.
Environmental Protection Agency, Research Triangle Park, NC. Environmental Criteria and Assessment Office.
Dec 93, 441p* EPA/600/AP-93/004B
See also PB87-142964, Volume 1, PB94-173127 and Volume 3, PB94-173143.
Also available in set of 4 reports, PC E99/MF E99, PB94-173119.

Table of contents:
- Environmental effects of ozone and related photochemical oxidants;
- Methodologies used in vegetation research;
- Species response/Mode of action;
- Factors that modify plant response;
- Effects-based air quality exposure indices;
- Exposure-response of plant species;
- Effects of ozone on natural ecosystems;
- Effects of ozone on agriculture, forestry, and ecosystems:
- Economics;
- Integrative summary and conclusions for vegetation and ecosystem effects;
- and Effects of ozone on materials.

Keywords: *Ozone, *Photochemical reactions, *Environmental effects, Air pollution effects(Plants), Air pollution effects(Materials), Agriculture, Forests, Plants(Botany), Vegetation, Absorption, Ecosystems, Economic impact, Atmospheric chemistry, Chemical reactions, Oxidants, Photochemistry, Environmental transport, Meteorological data, Mathematical models, NAAQS(National Ambient Air Quality Standards), Volatile organic compounds.

PB94-173143/REB PC **A99/MF A06**
Air Quality Criteria for Ozone and Related Photochemical Oxidants. Volume 3 or 3. Review draft.
Environmental Protection Agency, Research Triangle Park, NC. Environmental Criteria and Assessment Office.
Dec 93, 624p* EPA/600/AP-93/004C
See also PB87-142972, Volume 2, PB94-173135 and PB94-173150.
Also available in set of 4 reports, PC E99/MF E99, PB94-173119.

Table of contents:
- Toxicological effects of ozone and related photochemical oxidants (Respiratory tract effects of ozone;
- Systemic effects of ozone;
- and Interactions of ozone with other co-occurring pollutants);
- Human health effects of ozone and related photochemical oxidants (Controlled human exposure studies;
- Symptoms and pulmonary function in controlled studies of ambient air exposure;
- and Field and epidemiology studies);
- Extrapolation of animal toxicological data to humans (Ozone dosimetry;
- Species sensitivity;
- Lung function and inflammatory endpoints exemplifying an approach;
- and Quantitative extrapolation);
- and Integrative summary of ozone health effects.

Keywords: *Ozone, *Photochemical reactions, *Air pollution effects(Humans), Air pollution effects(Animals), Environmental effects, Health hazards, Public health, Risk assessment, Toxicity, Biochemistry, Dose-response relationships, Respiratory diseases, Lung disease, Epidemiology, Oxidants, Environmental transport, NAAQS(National Ambient Air Quality Standards), Volatile organic compounds.

PB94-173150/REB PC **A05/MF A01**
Air Quality Criteria for Ozone and Related Photochemical Oxidants. Chapter 1. Executive Summary and Chapter 9. Integrative Summary of Ozone Health Effects. Review draft.
Environmental Protection Agency, Research Triangle Park, NC. Environmental Criteria and Assessment Office.
Feb 94, 95p* EPA/600/AP-93/004D
See also PB87-142980, PB87-142998 and Volume 3, PB94-173143.
Also available in set of 4 reports PC E99/MF E99, PB94-173119.

Table of contents:
- Executive summary and Integrative summary of ozone health effects (Health effects of short-term exposures;
- Health effects of long-term exposures;
- Combined pollutant exposures;
- and Conclusions).

Keywords: *Ozone, *Air pollution effects(Humans), *Health effects, Respiratory diseases, Lung disease, Epidemiology, Toxicity, Dose-response relationships, Public health, Risk assessment, Environmental exposure, Respiration, Airway resistance, Biochemistry, NAAQS(National Ambient Air Quality Standards), Volatile organic compounds.

PB94-173366/REB PC **A06/MF A02**
North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.
Watershed Planning in the Albemarle-Pamlico Estuarine System. Report 1. Annual Average Nutrient Budgets.
Research Triangle Inst., Research Triangle Park, NC. Center for Environmental Analysis.
R. C. Dodd, G. McMahon, and S. Stichter. Aug 92, 103p APES-92-10
See also PB94-156544. Prepared in cooperation with Geological Survey, Raleigh, NC. Sponsored by North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study. and Environmental Protection Agency, Washington, DC.

The Albemarle-Pamlico (A/P) estuarine system is one of 17 estuaries identified nationwide under EPA's National Estuary Program. The purpose of the study was to estimate annual average nutrient loadings to surface waters in the A/P Study Area. Runoff from various land cover categories, direct input of atmospheric nutrients to surface waters, and point sources were considered. Nutrient sources to groundwater and transport from groundwater to surface waters were not considered. Pollutant loading factors ('export coefficients') were multiplied by the area in various land cover categories to estimate runoff inputs and atmospheric inputs. Output from EPA's Regional Atmospheric Deposition Model (RADM) was also used to estimate atmospheric nitrogen inputs. Nitrogen sources in order of decreasing magnitude are runoff, atmospheric inputs, upstream reservoirs, and point sources.

Keywords: *North Carolina, *Water pollution monitoring, *Nutrients, Pamlico Sound, Albemarle Sound, Estuaries, Watershed management, Water pollution sources, Point sources, Runoff, Land use, Air water interactions, Loading rates, Surface waters, Tables(Data), Albemarle/Pamlico Estuarine System, Nutrient budgets, Organic loading, National Estuary Program.

PB94-173374/REB PC **A04/MF A01**
Illinois State Environmental Protection Agency, Springfield.
Lake Water Quality Assessment Program, 1992. Northeastern Illinois Lakes.
Northeastern Illinois Planning Commission, Chicago.
H. L. Hudson, K. F. Soulliere, and T. R. Gray. Nov 93, 64p IEPA/WPC/93-140B
See also PB93-215929 and PB93-113538. Sponsored by Illinois State Environmental Protection Agency, Springfield.

The purpose of the publication is to present this lake assessment information and water/sediment quality data in a concise and easy-to-reference manner for use by lake managers, planners, researchers, and scientists. Section II provides brief descriptions of the physical and chemical water quality parameters analyzed. Section II also provides a summary page for each of the 35 sampled lakes, including a lake map and dissolved oxygen/temperature profile, and highlights the lake assessment information and water quality results. Section III presents the sediment quality data available at the time of publication. Finally, Section IV presents in tabular form the lake assessment information compiled for the 35 lakes sampled in 1992 as part of the LWQA grant program for the northeastern Illinois region.

Keywords: *Illinois, *Lakes, *Water quality data, Chemical properties, Physical properties, Water pollution sampling, Sediments, Nutrients, Water pollution

sources, Water chemistry, Chlorophyll, Suspended solids, Optical properties, Lake morphology, Lake morphometry, Northeastern Region(Illinois), Lake Water Quality Assessment.

PB94-174018/REB PC A06/MF A02
Environmental Protection Agency, Washington, DC.
Review of EPA's Environmental Monitoring and Assessment Program. Forests and Estuaries. Final rept.
National Research Council, Washington, DC.
c1994, 110p
Contract EPA-68-C00082/C
Sponsored by Environmental Protection Agency, Washington, DC.

The Environmental Monitoring and Assessment Program (EMAP) of the U.S. Environmental Protection Agency (EPA) is an ambitious, nationwide effort to monitor the status and changes in the condition of the nation's ecological resources to provide information for regulators, managers, and policy makers. To assist it in meeting this challenge, EPA requested that the National Research Council (NRC) provide an ongoing review of its developing program. In response to that request, the NRC constituted the Committee to Review EPA's Environmental Monitoring and Assessment Program in 1991. This is the committee's second report to EPA, and it focuses mainly on a review of EMAP's forest health monitoring component and the estuaries component. (Copyright (c) 1994 by the National Academy of Sciences.)

Keywords: *Environmental monitoring, *Aquatic ecosystems, *Forest management, Plant growth, Estuaries, Objectives, Bioindicators, Field tests, Biomass, Forest trees, Trends, Marine fishes, Sampling, Models, Habitats, Priorities, US EPA, Data management, EMAP(Environmental Monitoring and Assessment Program), Landscape characterization.

PB94-174174/REB PC A02/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Airborne Asbestos Concentrations during Spray-Buffing of Resilient Floor Tile. Journal article.
Environmental Quality Management, Inc., Cincinnati, OH.
A. Edwards, J. R. Kominsky, and R. W. Freyberg. cFeb 94, 8p EPA/600/J-94/225
Contract EPA-68-D2-0058
Pub. in Applied Occupational and Environmental Hygiene, v9 n2 p132-138 Feb 94. See also PB93-227551. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A study was conducted to determine the level of airborne asbestos concentrations during routine spray-buffing of asbestos-containing floor tiles at 17 schools in northern, central, and southern New Jersey. Increased airborne asbestos levels during spray-buffing were measured at 12 of the 17 schools. The increase was statistically significant at 7 of the 17 schools. Overall, the mean relative increase in airborne asbestos concentrations during spray-buffing with the high-speed machines (1000 to 1500 rpm) was statistically significantly higher than that during buffing with low-speed machines (175 to 330 rpm). (Copyright (c) 1994 AIH).

Keywords: *Asbestos, *Tiles, *Buffing, Air pollution sampling, Indoor air pollution, School buildings, Flooring, Mechanical polishing, Particles, New Jersey, Reprints, VAT(Vinyl Asbestos-containing Tiles), Airborne concentrations.

PB94-174182/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Explanatory Models for Ecological Response Surfaces. Book chapter.
Oak Ridge National Lab., TN. Environmental Sciences Div.
H. I. Jager, and W. S. Overton. 1993, 12p EPA/600/A-94/076
Pub. in Environmental Modeling with GIS, Chapter 42, 1993. See also DE92007840. Prepared in cooperation with Oregon State Univ., Corvallis. Dept. of Statistics. Sponsored by Corvallis Environmental Research Lab., OR. and Department of Energy, Washington, DC.

It is often spatial patterns in environmental and ecological variables that arouse interest and demand explanation. The spatial organization of ecological variables, such as species abundance, is often viewed as a collection of individual species responses to variation in the physical environment. In this chapter, the authors use a regression model to predict lake acid neutralizing capacity (ANC) based on environment predictor variables over a large region. These predictions are used to produce model-based population estimates. Two key features of the authors' modeling approach are that it honors the spatial context and the design of the sample data. The spatial context of the data is brought into the analysis of model residuals through the interpretation of residual maps and semivariograms. The sampling design is taken into account by including stratification variables from the design in the model. This ensures that the model applies to a real population. (Copyright (c) 1993 Oxford University Press.)

Keywords: *Ecosystems, *Mathematical models, *Regression analysis, Spatial dependencies, Population(Statistics), Estimates, Stratification, Spatial distribution, Lakes, Environmental surveys, Case studies, New York, Water pollution, Reprints, EMAP(Environmental Monitoring and Assessment Program), Response variables, ANC(Acid neutralizing capacity), ELS(Eastern Lake Survey), Adirondack lakes.

PB94-174190/REB PC A02/MF A01
Corvallis Environmental Research Lab., OR.
Empirical General Population Assessment of the Variance and Variance Estimators of the Horvitz-Thompson Estimator under Variable Probability Sampling. Symposium paper.
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
S. V. Stehman, and W. S. Overton. 1990, 10p EPA/600/A-94/074
Pub. in Proceedings of the Section on Statistics and the Environment. See also PB88-170840. Prepared in cooperation with Oregon State Univ., Corvallis. Dept. of Statistics. Sponsored by Corvallis Environmental Research Lab., OR.

The variance and two estimators of variance of the Horvitz-Thompson estimator were studied under randomized, variable probability systematic sampling. Three bivariate distributions, representing the populations, were investigated empirically, with each distribution studied for three correlations of the response variable, y, and auxiliary variable, x. The Horvitz-Thompson and Yates-Grundy variance estimators were compared based on confidence interval coverage, root mean square error, and proportion of negative estimates. The two variance estimators performed equally well except in some high-correlation populations, where the Yates-Grundy estimator had smaller root mean square error, and the Horvitz-Thompson estimator had a few negative estimates. As expected, the gain in precision of variable probability over equal probability sampling was greatest when the correlation between x and y was high, and the gain was reduced or absent when correlations were lower. (Copyright (c) American Statistical Association, 1990.)

Keywords: *Variance(Statistics), *Estimators, *Population(Statistics), *Sampling, Environmental surveys, Statistical distributions, Computerized simulation, Statistical inference, Bivariate analysis, Probability theory, Correlation, Confidence limits, Central tendency, Precision, Streams, Reprints, *RMSE(Root mean square error), *Population space analysis, NSWS(National Surface Water Surveys), Contour plots, EMAP(Environmental Monitoring and Assessment Program).

PB94-174208/REB PC A03/MF A01
Assessing Ozone Effects on Plants Native to the Southeastern United States. Symposium paper.
Corvallis Environmental Research Lab., OR.
H. S. Neufeld, J. R. Renfro, S. Huang, W. D. Hacker, and D. Mangis. c1994, 24p EPA/600/A-94/073
Pub. in Proceedings of 'International Association of Botanical Gardens', 1993. See also PB87-142972. Prepared in cooperation with Appalachian State Univ., Boone, NC. Dept. of Biology., Great Smoky Mountains National Park, Gatlinburg, TN., Auburn Univ., AL. School of Forestry., and ManTech Environmental Technology, Inc., Corvallis, OR.

For the last six years, the U.S. National Park Service, U.S. Environmental Protection Agency, and University researchers have been documenting the effects of ozone on a large number of woody and herbaceous species native to the southeastern United States. In Great Smoky Mountains National Park, (GRSM), ozone levels exhibit diel patterns at low elevations, where concentrations are low in the morning and high in the afternoon. At high elevations (>800 m), morning concentrations are much higher, and the total daily exposure is approximately twice that at the lower elevations. Putative ozone injury has been observed in the field in GRSM on 90 species, representing approximately 6% of the known flora in the Park. Surveys of foliar injury on several tree species show a general pattern of increasing frequency and amount of stipple with increasing elevation in GRSM, and in nearby Shenandoah National Park. Exposure-response studies were carried out in opentop chambers for six years with 46 species. Foliar symptoms seen in the field, were reproduced on 30 species, providing evidence that the foliar injury found in the field was probably due to ozone exposure.

Keywords: *Ozone, *Air pollution effects(Plants), *Plant growth, *Oxidizers, Exposure, Concentration(Composition), Field tests, Elevation, Foliage(Botany), Injuries, Plant genetics, Ecology, Mathematical models, Test chambers, Reprints, *Southeast Region(United States), GRSM(Great Smoky Mountains National Park), Atmospheric chemistry, Environmental transport.

PB94-174612/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Environmental Sampling and Monitoring. Journal article.
Sunny-ESF, Syracuse, NY.
S. V. Stehman, and W. S. Overton. c1994, 24p EPA/600/A-94/072
Pub. in Handbook of Statistics, Chapter 9, v12 p263-306 1994. See also PB92-103449. Prepared in cooperation with Oregon State Univ., Corvallis. Sponsored by Corvallis Environmental Research Lab., OR.

Methods of probability sampling provide a rigorous protocol by which scientifically reliable information on environmental issues may be obtained. The authors review fundamentals of probability sampling from the perspective of monitoring environmental resources. They first describe basic concepts and definitions of sampling, such as the sampling universe, population, and design-based inference. As the natural, general-estimator for probability sampling designs, the Horvitz-Thompson estimator provides the basis of a coherent strategy of consistent estimation. Rather than repeat descriptions of basic sampling designs available in many texts, they discuss practical implications of a few standard designs useful in environmental sampling. Topics in spatial sampling and monitoring over time are discussed, as are the role and implications of analytic uses of surveys. (Copyright (c) 1994 Elsevier Science B. V.)

Keywords: *Probability theory, *Sampling, *Environmental monitoring, Environmental surveys, Statistical inference, Estimators, Precision, Experimental design, Population(Statistics), Statistical data, Reprints, Probability sampling, EMAP(Environmental Monitoring Assessment Program), NSS(National Stream Survey), NLS(National Lake Survey).

PB94-174703/REB PC A02/MF A01
Comparison of the Relative Sensitivity of Three Benthic Invertebrates to Copper-Contaminated Sediments from the Keweenaw Waterway. Journal article.
Environmental Research Lab.-Duluth, MN.
C. W. West, V. R. Mattson, E. N. Leonard, G. L. Phipps, and G. T. Ankley. c1993, 9p EPA/600/J-94/248
Pub. in Hydrobiologia 262, p57-63, 1993. See also PB85-124626.

The Keweenaw Peninsula in northern Michigan was once a major copper mining area and these mining acivities were responsible for depositing tons of tailings in and around the Keweenaw Waterway. In the fall of 1990, sediments were collected from various locations along the Waterway. Ten-day tests were conducted with the samples using three species of benthic invertebrates that have been proposed as suitable for evaluating the toxicity of freshwater sediments: Hyalella azteca (amphipods), Chironomus tentans (chironomids) and Lumbriculus variengatus (oligochaetes). A number of sediments were toxic to one or more of the three species and, in general, there was good agreement among the tests with regard to identifying toxic

samples. Unexpectedly, the relative sensitivity of the three species to the test sediments was not accurately predicted from water-only copper exposures. This indicates that factors modifying exposure, such as different lifestyles and/or varying sensitivity to physicochemical characteristics of sediments can influence results of sediment toxicity tests. (Copyright (c) 1993 Kluwer Academic Publishers.)

Keywords: *Water pollution effects(Animals), *Sediments, *Toxicity, Copper, Benthic fauna, Invertebrates, Amphipoda, Oligochaetes, Soil contamination effects, Physicochemical properties, Sampling, Lakes, Rivers, Mortality, Michigan, Reprints, Chironomids, Hyallela azteca, Chironomus tentans, Lumbriculus variegatus, Keweenaw Waterway.

PB94-174711/REB PC **A01**/MF **A01**
Scoping the Chemicals in Your Drinking Water. Journal article.
Environmental Research Lab., Athens, GA.
S. D. Richardson. cMar 94, 4p EPA/600/J-94/249
Pub. in Today's Chemist at Work, v3 n3 p29-32 Mar 94.

Chlorine, the most common drinking water disinfectant in the United States, is effective for killing harmful microorganisms, but it produces a few disinfection byproducts (DBPs) about which health concerns have been raised. Among the more predominant chlorination DBPs are trihalomethanes (TMHs), and one of these TMHs--chloroform--has been linked to cancer in test animals. To identify DBPs, a multispectral analysis approach is used that incorporates gas chromatography coupled with high resolution electron impact mass spectroscopy, chemical ionization mass spectrometry, and Fourier transform infrared spectroscopy. Each component technique provides different types of information. The multispectral approach will be applied to identify DBPs of disinfectant processes employing chlorine dioxide, ozone, monochloramine, and other alternative disinfectants. (Copyright (c) 1994 Today's Chemist at Work.)

Keywords: *Drinking water, *Disinfectants, *Byproducts, *Chlorine, Water treatment, Chlorination, Water analysis, Ozonization, Chlorine dioxide, Ohio River, Halohydrocarbons, Carboxylic acids, Haloalkanes, Chloroform, Maleic acid, Spectroscopic analysis, Reprints, DBPs(Disinfection byproducts), Cryptosporidia.

PB94-174729/REB PC **A03**/MF **A01**
Environmental Research Lab., Athens, GA.
Aspects of Spatial and Temporal Aggregation in Estimating Regional Carbon Dioxide Fluxes from Temperate Forest Soils. Journal article.
Marine Biological Lab., Woods Hole, MA. Ecosystems Center.
D. W. Kicklighter, J. M. Melillo, W. T. Peterjohn, E. B. Rastetter, and A. D. McGuire. c1994, 16p EPA/600/J-94/250
Grant EPA-R-817734
Pub. in Jnl. of Geophysical Research, v99 nD1 p1303-1315, 20 Jan 94. Prepared in cooperation with New Hampshire Univ., Durham. Inst. for the Study of Earth, Oceans and Space. Sponsored by Environmental Research Lab., Athens, GA. and National Inst. for Global Environmental Change, Cambridge, MA. Northeast Regional Center.

The authors examine the influence of aggregation errors on developing estimates of regional soil-CO2 flux from temperate forests. The authors find daily soil-CO2 fluxes to be more sensitive to changes in soil temperatures than air temperature. The direct use of mean monthly air temperature with a daily flux model underestimates regional fluxes by approximately 4%. Temporal aggregation error varies with spatial resolution. Overall, the authors' calibrated modeling approach reduces spatial aggregation error by 9.3% and temporal aggregation error by 15.5%. After minimizing spatial and temporal aggregation errors, mature temperature forest soils are estimated to contribute 12.9 Pg C/yr to the atmosphere as carbon dioxide. Georeferenced model estimates agree well with annual soil-CO2 fluxes measured during chamber studies in mature temporate forest stands around the globe. (Copyright (c) 1994, American Geographical Union.)

Keywords: *Global, *Climatic changes, *Soils, *Forestry, Carbon dioxide, Atmospheric temperature, Sensitivity, Flux rate, Temporal distributions, Measurement, Regions, Air pollution, Fossil fuels, Spatial distribution, Mathematical models, Errors, Estimates, Graphs(Charts), Tables(Data), Reprints.

PB94-174737/REB PC **A02**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Exploratory Research.
Transport and Transformation of Contaminants Near the Sediment-Water Interface. Chapter 1. Introduction. Book chapter.
Clarkson Univ., Potsdam, NY. Dept. of Civil and Environmental Engineering.
J. V. DePinto, W. Lick, and J. F. Paul. c1994, 7p ISBN-0-87371-887-9, EPA/600/A-94/087, , ERLN-1509
Contract EPA-R-815-182
Pub. in Transport and Transformation of Contaminants Near the Sediment-Water Interface, p1-5 1994. Library of Congress catalog card no. 93-6153. Sponsored by Environmental Protection Agency, Washington, DC. Office of Exploratory Research.

In the past two decades great strides have been made in the reduction of direct discharges of contaminants to surface waters (both freshwater and marine systems). Aquatic systems that have been the beneficiary of such abatement have shown improvements in water quality and biotic community integrity. In virtually all instances, however, the system recovery has been incomplete; surveillance and monitoring efforts continue to demonstrate the presence and impact of toxic substances. Problems of toxicity to aquatic organisms, disruption of ecosystem structure and functioning, and bioaccumulation of toxic substances in aquatic food chains are still being identified for both metals and organic chemicals. (Copyright (c) 1994 CRC Press.)

Keywords: *Water pollution, *Sediment-water interfaces, *Aquatic ecosystems, Bottom sediments, Toxic substances, Environmental effects, Environmental transport, Biological accumulation, Food chains, Aquatic biology, Surface waters, Reprints.

PB94-174745/REB PC **A03**/MF **A01**
Evaluation of Nutritional and Operational Requirements for Biodegradation of Chlorinated Phenols by the White Rot Basidiomycete, 'Phanerochaete chrysosporium' in RBC Reactors.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
H. H. Tabak, J. A. Glaser, S. Strohofer, M. J. Kupferle, and P. Scarpino. 1994, 17p EPA/600/A-94/088
Presented at the Annual Air and Waste Management Association Meeting and Exhibition (84th), Vancouver, British Columbia, June 16-21, 1991. Prepared in cooperation with Cincinnati Univ., OH.

The ability to degrade and detoxify organic and inorganic constituents requires two complementary features of microbial competence; the biochemical means (enzymes) to detoxify wastes and the capability of a single organism or a multiplicity of compatible organisms of complementary competence to effect this required metabolism. An example of a single, highly competent organism is the wood-degrading fungus, Phanerochaete chrysosporium, which has the potential to degrade the aromatic components of toxic and hazardous waste. This fungus has been utilized to treat liquid-phase wastes in a rotating biological contractor (RBC), the MyCoR process. The research program explores the use of the MyCoR process as a hazardous waste site clean-up technology, addressing issues of application and practicality to emphasize cost effectiveness and efficiency. In these studies, biochemical and mechanical parameters were optimized for biodegradation by the use of Pshrysosporium biofilms in bench-scale and pilot-scale RBCs. (Copyright (c) 1991 Air and Waste Management Association.)

Keywords: *Biodegradation, *Contactors, *Waste water treatment, *Meetings, Basidiomycetes, Fungi, Chemical reactors, Biotechnology, Pulp mills, Industrial wastes, Chlorohydrocarbons, Phenols, Pilot plants, Case studies, Hazardous materials, Reprints, *RBC(Rotating biological contactor), White rot basidiomycetes, Phanerochaete chrysosporium.

PB94-174752/REB PC **A06**/MF **A02**
Statistical Summary: EMAP-Estuaries, Louisianian Province-1992. Environmental Monitoring and Assessment Program.
Environmental Research Lab., Gulf Breeze, FL.
J. M. Macauley, J. K. Summers, V. D. Engle, P. T. Hetimuller, and G. T. Brooks. Jan 94, 111p EPA/620/R-94/002
See also PB94-117488. Prepared in cooperation with Technical Resources, Inc., Gulf Breeze, FL. and Computer Sciences Corp., Gulf Breeze, FL.

The statistical summary of the ecological condition of the estuarine resources is based on the results of the 1992 Louisianian Province Demonstration Project. One hundred and sixty-nine sites between Anclote Anchorage, FL and the Rio Grande, TX were sampled during the eight-week sampling period. A series of indicators that are representative of the overall condition of estuarine resources was measured at each site. These indicators were designed to address three major attributes of concern: (1) estuarine biotic integrity, (2) societal values related to public use of estuarine resources, and (3) pollutant exposure or the environmental conditions under which biota live.

Keywords: *Louisiana, *Mexico Gulf, *Estuaries, Ecology, Benthos, Fishes, Water pollution effects, Bioaccumulation, Toxicity, Contamination, Exposure, Sediments, Dissolved oxygen, Water chemistry, EMAP(Environmental Monitoring and Assessment Program).

PB94-174760/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Methane Emissions from Industrial Sources. Book chapter Oct 90-Oct 91.
Science Applications International Corp., Denver, CO.
L. L. Beck, S. D. Piccot, and D. A. Kirchgessner. c1993, 35p EPA/600/A-94/089
Contracts EPA-68-D9-0173, EPA-68-D0-0122
Pub. in Atmospheric Methane: Sources, Sinks, and Role in Global Change, NATO ASI Series, v1-13 p399-431 1993. See also PB91-103572 and PB91-127753. Prepared in cooperation with Southern Research Inst., Durham, NC. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

This chapter identifies and describes major industrial sources of methane (CH4) emissions. For each source type examined, CH4 release points are identified and a detailed discussion of the factors affecting emissions is provided. A summary and discussion of available global and country-specific CH4 emissions estimates are also presented. The major emission sources examined include coal mining operations and natural gas production and distribution systems. However, a variety of minor industrial sources are also examined because their collective contributions to the global CH4 budget may be significant. Among the minor industrial sources examined here are: coke production facilities, chemical manufacturing operations, peat mining operations, light water nuclear reactors, fossil fuel combustion equipment (boilers and automobiles), geothermal electricity generation facilities, salt mining operations, residential refuse burning, and shale oil mining operations. (Copyright (c) Springer-Verlag 1993.)

Keywords: *Methane, *Air pollution sources, *Emissions, Natural gas industry, Combustion products, Coal mining, Chemical industry, Petroleum industry, Mobile pollutant sources, Air pollution monitoring, Emission factors, Global aspects, Reprints.

PB94-174778/REB PC **A24**/MF **A04**
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.
Wildlife Exposure Factors Handbook. Volume 1 of 2.
ICF, Inc., Fairfax, VA.
M. McVey, K. Hall, P. Trenham, A. Soast, and L. Frymier. Dec 93, 575p EPA/600/R-93/187A, , OHEA-E-391
Contracts EPA-68-C8-0003, EPA-68-W8-0098
See also PB90-106774. Sponsored by Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.

The Handbook provides information on various factors used to assess exposure to wildlife. The goals of the project are (1) to promote the application of risk assessment methods to wildlife species; (2) to foster a consistent approach to wildlife exposure and risk assessment; and (3) to increase the accessibility of the literature applicable to these assessments. The bulk of the document summarizes literature values for exposure factors for 34 species of birds, mammals, amphibians, and reptiles. In addition, the document contains a chapter on allometric equations that can be used to estimate some of the exposure factors when data are lacking and a description of some common equations used to estimate exposure.

Keywords: *Risk assessment, *Wildlife, *Exposure, *Ecosystems, *Pollution sources, Handbooks, Birds, Mammals, Amphibia, Reptiles, Growth rate, Populations, Metabolism, Density(Mass/volume), Diets, Fecundity, Seasonal variations, Mortality, Feeding stuffs, Air pollution sampling, Mathematical models.

PB94-174786/REB PC A03/MF A01
Association of Personal and Workplace Characteristics with Health, Comfort and Odor: A Survey of 3948 Office Workers in Three Buildings. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
L. A. Wallace, C. J. Nelson, R. Highsmith, and G. Dunteman. 1993, 12p EPA/600/J-94/237
Pub. in Indoor Air, v3 p193-205 1993.

A questionnaire on health symptoms, workplace conditions, and perceived indoor air quality was administered to 3948 employees of the Environmental Protection Agency in Washington, DC in the winter of 1989. The main goal was to determine the personal or workplace characteristics associated with health symptoms. A principal components analysis of 32 health symptoms identified 12 health factors. The 12 health factors were regressed linearly on the 50-100 personal, workplace, and spatial characteristics identified from the questionnaire and building blueprints. Eleven variables were associated with multiple health factors. The main workplace variables were dust and glare. Personal characteristics of importance were mold allergies and sensitivity to chemicals. Two measures of stress - heavy workload and conflicting demands - were also associated with several health factors. (Copyright (c) Munksgaard 1993.)

Keywords: *Indoor air pollution, *Health surveys, *Industrial medicine, *Office buildings, Occupational exposure, Work environments, Questionnaires, Odors, Comfort, Ventilation, Psychological effects, Health status indicators, Biostatistics, Multivariate analysis, US EPA, *Sick Building Syndrome, Principal components analysis.

PB94-174794/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Waste Management. (Chapter 16). Book chapter Aug 91-Aug 92.
Radian Corp., Research Triangle Park, NC.
S. A. Thorneloe, M. A. Barlaz, R. Peer, L. C. Huff, and L. Davis. c1993, 38p EPA/600/A-94/090
Contract EPA-68-D9-0054T31
Pub. in Atmospheric Methane: Sources, Sinks, and Role in Global Change, NATO ASI Series, vI-13 p362-398 1993. See also PB89-110381 and PB91-197061.
Prepared in cooperation with North Carolina State Univ., Raleigh. Dept. of Chemical Engineering. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

Landfills, wastewater treatment lagoons, and livestock waste management are operations representing sources of methane. The report begins with a brief overview of how CH4 is generated from the anaerobic decomposition of waste and then discusses generation of CH4 in detail in landfills, wastewater treatment lagoons, and livestock waste management. Current techniques for estimating CH4 emissions from waste are summarized, and sources of uncertainty are identified. (Copyright (c) Springer-Verlag 1993.)

Keywords: *Methane, *Greenhouse gases, *Waste management, *Air pollution sources, Waste disposal, Landfills, Municipal wastes, Lagoons(Ponds), Anaerobic processes, Decomposition, Agricultural wastes, Water treatment, Waste water, Gas production, Emission factors, Environmental transport, Reprints.

PB94-175858/REB PC A03/MF A01
Combined Sewer Overflow (CSO) Control Policy. Final rept.
Environmental Protection Agency, Washington, DC. Office of Water.
Apr 94, 37p EPA/830/B-94/001
See also PB92-179761.

The policy establishes a consistent national approach for controlling discharges from CSOs to the Nation's waters through the National Pollutant Discharge Elimination System (NPDES) permit program. The main purposes of this policy are to elaborate on the EPA's National (CSO) Control Strategy, published in 1989, and to expedite compliance with the requirements of the Clean Water Act.

Keywords: *Combined sewers, *Overflows, *Water pollution control, Storm water runoff, Outfall sewers, Storm sewers, Water treatment, Pollution regulations, Government policies, Requirements, Permits, Standards compliance, Clean Water Act, National Pollutant Discharge Elimination System.

PB94-175866/REB PC A04/MF A01
Ground Water Supply Survey. Summary of Volatile Organic Contaminant Occurrence Data. Summary rept.
Environmental Protection Agency, Cincinnati, OH. Technical Support Div.
J. J. Westrick, J. W. Mello, and R. F. Thomas. Jan 83, 57p

The document summarizes a sampling and analysis program on finished water from 945 water supplies which use underground sources. The program was conducted in order to strengthen the volatile organic chemical occurrence data base and to encourage state involvement in the VOC problem.

Keywords: *Drinking water, *Ground water, Water supply, Water pollution sampling, Water pollution monitoring, Path of pollutants, Water systems, Halogenated aromatic hydrocarbons, Halogenated aliphatic hydrocarbons, Statistical analysis, *Volatile organic compounds.

PB94-175932/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Evaluation of Mercury Emissions from Fluorescent Lamp Crushing. Final rept.
EC/R, Inc., Durham, NC.
W. Battye, U. McGeough, and C. Overcash. Feb 94, 35p EPA/453/R-94/018
Contract EPA-68-D1-0119
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The report presents an evaluation of mercury emissions from the crushing of fluorescent light bulbs. Background information on mercury-containing fluorescent lamps and their disposal is also presented. These light bulbs are crushed as the first step in recovery of mercury, or disposal of the bulbs in a landfill or incinerator. Three different crushing systems are described in detail, and variations on these systems are also discussed. The report describes the air pollution controls on each system, and emissions of mercury from the crushing process are estimated. This information provides the basis for evaluating the potential for mercury emissions from the crushing of fluorescent light bulbs, and the efficacy of available air pollution controls in limiting these emissions.

Keywords: *Mercury(Metal), *Fluorescent lamps, *Crushing, Air pollution control, Emissions, Waste disposal, Waste processing, Materials handling, Waste management.

PB94-176054/REB PC A01/MF A01
Prediction of Bioaccumulation of Metals from Contaminated Sediments by the Oligochaete, 'Lumbriculus variegatus'. Journal article.
Environmental Research Lab.-Duluth, MN.
G. T. Ankley, E. N. Leonard, and V. R. Mattson. 1994, 5p EPA/600/J-94/259
Pub. in Water Resources, v28 n5 p1071-1076 1994.
See also PB91-172288.

Short-term tests with benthic species have shown that certain cationic metals (cadmium, nickel, lead, zinc, copper) in sediments are not bioavailable when acid volatile sulfide (AVS) concentrations are sufficient to bind the metals, and/or when concentrations of metals in the sediment pore water are small. It was uncertain, however, whether a similar lack of bioavailability could be predicted when evaluating metal bioaccumulation in long-term exposures. In this study, the authors exposed the oligochaete Lumbriculus variegatus to sediments from the lower Fox River, Wisconsin, which contained elevated concentrations of metals. After a 30 day exposure to the test sediments, L. variegatus contained concentrations of metals not significantly greater than those in control oligochaetes exposed only to Lake Superior water. This indicates that metal bioavailability models based on sediment AVS content and/or pore water concentrations may be valid for long-term as well as short-term exposures of benthic species.

Keywords: *Sediments, *Metals, *Toxicity, Chronic exposure, Bioaccumulation, Pore water, Oligochaetes, Concentration(Composition), Lake Superior, Fox River, Lake sediments, Water pollution monitoring, Invertebrates, Cadmium, Nickel, Lead(Metal), Copper, Zinc, Benthic fauna, Risk assessment, Wisconsin, Reprints, AVS(Acid volatile sulfide), Bioavailability, Lumbriculus variegatus.

PB94-176062/REB PC A03/MF A01
Update of the U.S. Environmental Protection Agency's SITE Emerging Technology Program, 1993. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
N. M. Lewis, and R. A. Parker. Feb 94, 11p EPA/600/J-94/260
Pub. in Jnl. of the Air and Waste Management Association, v44 n2 p195-203 Feb 94. See also PB91-171678, PB92-150663, and PB93-150159.

The purpose of this article is to provide: (1) information about understanding the SITE Emerging Technology Program and how it operates; (2) an account of the progress of the ETP's first seven years (1987-1993) of operation (the ETP started one year later than the demonstration program); (3) a list of ETP technologies with research completed; (4) a description of those technologies selected from the 1993 selection; and (5) an awareness that the program has traditionally been providing funding and technical support to the private sector for the acceleration of research and development. (Copyright (c) 1994 Air & Waste Management Association.)

Keywords: *Superfund, *Hazardous materials, *Waste management, Pollution control, Remedial action, Alternatives, Research and development, Field tests, Technology innovation, Performance evaluation, Biological treatment, Physical treatment, Funds, Reprints, SITE(Superfund Innovative Technology Evaluation), ETP(Emergency Technology Program), Innovative treatment technologies, Chemical treatment, Thermal treatment.

PB94-176070/REB PC A03/MF A01
Refined Estimates of Biogenic Hydrocarbon Emissions for Atlanta. Interim rept. Jan 92-Nov 93.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
T. E. Pierce, D. H. Coventry, A. R. Van Meter, and C. D. Geron. Nov 93, 25p EPA/600/A-94/091
Presented at the Air and Waste Management Association (AWMA) International Conference on Regional Photochemical Measurement and Modeling Studies, La Jolla, CA., November 8-12, 1993. See also PB93-122380. Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div.

Biogenic emissions of volatile organic compounds (VOCs) reportedly play an important role in ozone nonattainment for Atlanta. To better understand this problem, the Southern Oxidant Study participated in an intensive field experiment around Atlanta during the summer of 1992. This paper compares estimates from three different inventories. The first inventory uses the existing Biogenic Emissions Inventory System (BEIS) in the Urban Airshed Model (UAM). UAM-BEIS relies on county-aggregated land use patterns and emission factors dating back to the 1970's. A second inventory incorporates recent (circa 1990) satellite data. Information from the U.S. Forest Service (USFS) is used to increase the coverage of trees in urban areas from 20% to 30%. The third inventory uses USFS forest inventory statistics to compute leaf biomass and tree species composition for about 1 acre forest survey plots, which are extrapolated to about 2000 hectares forest areas as delineated by aerial photography.

Keywords: *Hydrocarbons, *Air pollution monitoring, Reprints, Emission factors, Air pollution sources, Natural emissions, Vegetation, Trees(Plants), Biomass, Land use, Atmospheric diffusion, Ozone, Photochemical reactions, *Atlanta(Georgia), Urban Airshed Model,

Biogenic Emissions Inventory System, Emission inventories, Volatile organic compounds.

PB94-176120/REB PC A03/MF A01
Photochemical Urban Airshed Modeling Using Diagnostic and Dynamic Meteorological Fields. Conference paper.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
J. M. Godowitch, and J. M. Vukovich. Jun 94, 24p EPA/600/A-94/092
Presented at the Annual Air and Waste Management Association Meeting and Exhibition (87th), Cincinnati, OH., June 19-24, 1994. See also PB91-131243. Prepared in cooperation with MCNC, Research Triangle Park, NC. North Carolina Supercomput ing Center.

Spatial pollutant patterns and peak concentrations are strongly influenced by meteorological parameters. Therefore, accurate hourly, gridded meteorological data sets are crucial inputs for photochemical modeling. An effort has been underway to apply both diagnostic and dynamic meteorological models in order to generate inputs needed in photochemical grid model simulations. The model being employed is a modified version of the Urban Airshed Model (UAM), which was designed to accept input files generated from both meteorological approaches. In this effort, both meteorological models were exercised in two different urban domains situated next to water bodies and with significant terrain features (i.e., greater metropolitan NYC and LA basin). A historical high ozone day in the NYC domain was simulated which exhibited a strong large scale flow pattern conducive to interurban transport along the northeastern coast. Results from simulations of an ozone episode from the 1987 Southern California Air Quality Study (SCAQS) indicated that the simulations using dynamic model winds with data assimilation displayed less absolute error than simulations using diagnostically or objectively-derived winds.

Keywords: *Meteorological data, *Air pollution dispersion, Reprints, Ozone, Photochemistry, Three-dimensional models, Mathematical models, Wind(Meteorology), Air temperature, Turbulent diffusion, Mixing height, Atmospheric circulation, Regional airsheds, Diagnostic techniques, Dynamic models, Urban areas, *Urban Airshed Model, Eulerian photochemical grid model.

PB94-176138/REB PC A03/MF A01
Evaluation of Potential Confounding Factors in Sediment Toxicity Tests with Three Freshwater Benthic Invertebrates. Journal article.
Environmental Research Lab.-Duluth, MN.
G. T. Ankley, D. A. Benoit, J. C. Balogh, T. B. Reynoldson, and K. E. Day. c1994, 11p EPA/600/J-94/252
Pub. in Environmental Toxicology and Chemistry, v13 n4 p627-635 1994. See also PB84-128677, PB89-125934 and AD-A269 382. Prepared in cooperation with Spectrum Research, Inc., Duluth, MN., National Water Research Inst., Burlington (Ontario)., and Science Applications International Corp., Hackensack, NJ.

The authors examined the effects of natural sediment physiochemical properties on the results of lab tests with the amphipod Hyalella azteca, the midge Chironomus tentans, and the oligochaete Lumbriculus variegatus. Ten-day exposures with the three species were conducted with 50 uncontaminated sediment samples from Lakes Erie, Huron, Superior, and Ontario, which differed markedly with regard to characteristics such as grain-size distribution, organic carbon content, and mineralogical composition. Tests were conducted both with and without the addition of exogenous food. Survival of Hyalella azteca, survival and growth of Chironomus tentans, and survival/reproduction and growth of Lumbriculus variegatus were significantly greater in tests in which the animals were fed vs. those in which they were not. Hence, there is significant potential for false positive results if Hyalella azteca or Chironomus tentans is not fed during sediment tests. Predictive modeling of the assay results in relationship to sediment physiochemical characteristics failed to reveal any additional factors that influenced survival of Hyalella azteca and Chironomus tentans, or reproduction and growth of Lumbriculus variegatus in tests in which the organisms were fed. However, linear modeling did suggest that growth of fed as well as unfed Chironomus tentans may have been influenced by grain-size distribution of the test sediments.

Keywords: *Sediments, *Invertebrates, *Toxicity, *Bias, Amphipoda, Physicochemical properties, Lake sediments, Particle size distribution, Mortality, Reproduction(Biology), Growth, Oligochaetes, Midges, Bioaccumulation, Aquatic ecosystems, Assaying, Lake Erie, Lake Superior, Lake Huron, Lake Ontario, Statistical analysis, Hyalella azteca, Chironomus tentans, Lumbriculus variegatus.

PB94-176146/REB PC A03/MF A01
Evaluation of Equilibrium Partitioning Theory for Predicting Acute Toxicity of Field-Collected Sediments Contaminated with DDT, DDE and DDD to the Amphipod 'Hyalella Azteca'. Journal article.
Environmental Research Lab.-Duluth, MN.
R. A. Hoke, G. T. Ankley, A. M. Cotter, T. Goldenstein, and P. A. Kosian. c1994, 12p EPA/600/J-94/255
Pub. in Environmental Toxicology and Chemistry, v13 p157-166 1994. See also PB81-117491, PB92-231521 and PB94-114733. Prepared in cooperation with AScI Corp., Duluth, MN.

DDT is a persistent and toxic nonionic organic chemical commonly present as a contaminant in aquatic sediments. As a result of effluent discharges by a chemical company manufacturing DDT on the Redstone Army Arsenal near Huntsville, Alabama, the water column, sediment, and biota of the Huntsville Spring Branch-Indian Creek stream system (HSB-IC) became heavily contaminated with DDT and its metabolites, DDE and DDD. Because DDT appeared to be the primary contaminant in the sytem, an investigation was begun to evaluate equilibrium partitioning theory (EqP) as a basis for predicting the free pore-water concentrations in and toxicity of DDT-contaminated sediments for the system. These data demonstrate an effect-based EqP prediction of the toxicity of field-collected sediments contaminated by a nonionic organic compound and the potential utility of the EqP approach for developing sediment quality criteria.

Keywords: *Sediments, *Toxicity, *Pesticides, Amphipoda, DDT, Pore water, Separation, Mortality, Bioindicators, Assaying, Organic chlorine compounds, Concentration(Composition), Water pollution effects(Animals), Acute exposure, Water pollution monitoring, Reprints, Hyalella azteca, DDE, DDD, Sediment quality criteria, EqP(Equilibrium partitioning), Huntsville(Alabama).

PB94-176153/REB PC A02/MF A01
Science Applications International Corp., Hackensack, NJ.
Organic Carbon Partitioning as a Basis for Predicting the Toxicity of Chlorpyrifos in Sediments. Journal article.
Environmental Research Lab.-Duluth, MN.
G. T. Ankley, D. J. Call, J. S. Cox, M. D. Kahl, and R. A. Hoke. c1994, 8p EPA/600/J-94/256
Pub. in Environmental Toxicology and Chemistry, v13 n4 p621-626 1994. See also PB87-105367 and PB92-231521. Prepared in cooperation with Wisconsin Univ.-Superior. Lake Superior Research Inst. Sponsored by Science Applications International Corp., Hackensack, NJ.

The objective of the study was to evaluate an organic carbon partitioning model for predicting bioavailability of the organophosphate chlorpyrifos in sediments, in support of the development of a sediment-quality criterion for the pesticide. Initial 10-d water-only toxicity tests were conducted with the midge Chironomus tentans to define the sensitivity of this species to chlorpyrifos. Ten-day toxicity tests with Chironomus tentans were conducted with the spiked sediments under conditions similar to those in the water-only exposure. Based on predicted pore-water concentrations of chlorpyrifos, results of the water-only and sediment tests were in close agreement. Overall, these results suggest that within the range of organic carbon tested in the present study, an equilibrium partitioning model was based on organic carbon is appropriate for predicting the bioavailability of sediment-associated chlorpyrifos to benthic invertebrates.

Keywords: *Sediments, *Toxicity, *Pesticides, *Invertebrates, Benthic fauna, Midges, Pore water, Concentration(Composition), Mortality, Separation, Biological indicators, Organic compounds, Carbon, Water pollution monitoring, Assaying, Reprints, Chlorpyrifos, Chironomus tentans, SQC(Sediment quality criteria), Bioavailability.

PB94-176161/REB PC A02/MF A01
Assessing Potential Bioavailability of Metals in Sediments: A Proposed Approach. Journal article.
Environmental Research Lab.-Duluth, MN.
G. T. Ankley, N. A. Thomas, D. M. Di Toro, D. J. Hansen, and J. D. Mahony. c1994, 9p EPA/600/J-94/257
Prepared in cooperation with Hydroqual, Inc., Mahwah, NJ., Manhattan Coll., Bronx, NY. Dept. of Chemistry., Science Applications International Corp., Narragansett, RI., and Delaware Univ., Newark. Dept. of Civil Engineering.

Due to anthropogenic inputs, elevated concentrations of metals frequently occur in aquatic sediments. In order to make defensible estimates of the potential risk of metals in sediments and/or develop sediment quality criteria for metals, it is essential to identify that fraction of the total metal in the sediments that is bioavailable. Studies with a variety of benthic invertebrates indicate that interstitial (pore) water concentrations of metals correspond very well with the bioavailability of metals in test sediments. Many factors may influence pore water concentrations of metals; however, in anaerobic sediments a key phase controlling partitioning of several cationic metals (cadmium, nickel, lead, zinc, copper) into pore water is acid volatile sulfide (AVS). In this paper, the authors present an overview of the technical basis for predicting bioavailability of cationic metals to benthic organisms based on pore water metal concentrations and metal-AVS relationships. (Copyright (c) 1994 Springer-Verlag New York Inc.)

Keywords: *Sediments, *Metals, *Toxicity, Risk assessment, Invertebrates, Benthic fauna, Water pollution monitoring, Pore water, Concentration(Composition), Cadmium, Nickel, Copper, Zinc, Lead(Metal), Interfaces, Physicochemical properties, Seasonal variations, AVS(Acid volatile sulfide), Bioavailability, Sediment quality criteria.

PB94-176179/REB PC A03/MF A01
AERMOD: A Dispersion Model for Industrial Source Applications. Conference paper.
Environmental Protection Agency, Philadelphia, PA. Region III.
S. G. Perry, A. J. Cimorelli, R. F. Lee, R. J. Paine, and A. Venkatram. 1994, 26p EPA/600/A-94/093
See also PB92-232453, PB92-232461 and PB92-232473. Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div., ENSR Consulting and Engineering, Acton, MA., California Univ., Riverside. Coll. of Engineering., and National Center for Atmospheric Research, Boulder, CO.

The paper describes a new air pollution dispersion model, AERMOD, that is designed for applications currently handled by the ISC2 model and beyond. AERMOD consists of: a meteorological interface that computes vertical profiles of wind, turbulence, and temperature; dispersion algorithms for the daytime convective boundary layer; dispersion algorithms for the nighttime stable boundary layer; treatment of surface, near-surface, and elevated releases (buoyant and no-buoyant); and treatment of complex terrain which accounts for the dividing streamline height concept (in stable flows) and applies for all terrain heights from stack base on up. Associated with AERMOD is a meteorological preprocessor and a terrain/receptor preprocessor that are also described. The paper also overviews the planned model evaluations and AERMIC's future plans for AERMOD.

Keywords: *Air pollution dispersion, *Diffusion modeling, Reprints, Atmospheric diffusion, Air pollution sources, Industry, Meteorological data, Turbulence, Convection, Air flow, Wind(Meteorology), Boundary layer flow, Environmental transport, Algorithms, Mathematical models, *AERMOD model.

PB94-176187/REB PC A01/MF A01
Influence of Age on the Relative Sensitivity of 'Hyalella azteca' to Diazinon, Alkylphenol Ethoxylates, Copper, Cadmium, and Zinc. Journal article.
Environmental Research Lab.-Duluth, MN.
S. A. Collyard, G. T. Ankley, R. A. Hoke, and T. Goldenstein. c1994, 4p EPA/600/J-94/254
Pub. in Archives of Environmental Contamination and Toxicology 26, p110-113 1994. See also PB85-205383 and PB89-207013. Prepared in cooperation with Science Applications International Corp., Hackensack, NJ. and AScI Corp., Duluth, MN.

Laboratories testing Hyalella azteca use a wide range of ages (or sizes) of the amphipod in their studies. The objective of this study was to investigate age-specific differences in sensitivity of the amphipod to contaminants with varying toxic modes of action. Hyalella azteca, ranging in age from <1 to 26 d, were tested in 96-h water-only exposures with the organophosphate pesticide diazinon, a mixture of alkylphenol ethoxylates (nonionic surfactants), copper sulfate, cadmium chloride, and zinc sulfate. Overall age-specific differences in sensitivity to the five test chemicals were relatively small. When differences in sensitivity were observed, trends were apparently related to the contaminant tested rather than to the age of the amphipods, i.e., no particular age class consistently was the most sensitive to the toxicants.

Keywords: *Pesticides, *Amphipoda, *Toxicity, *Water pollution effects(Animals), Lethality, Concentration(Composition), Invertebrates, Age, Test methods, Phosphorous organic compounds, Acute exposure, Diazinon, Copper, Cadmium, Zinc, Reprints, Hyalella azteca, Alkylphenol ethoxylates, Contaminant sensitivity test.

PB94-176195/REB PC A03/MF A01
Predicting Modes of Toxic Action from Chemical Structure: An Overview. Journal article.
Environmental Research Lab.-Duluth, MN.
S. P. Bradbury. 1994, 18p EPA/600/J-94/258
Pub. in SAR and QSAR in Environmental Research, v2 p89-104 1994. Presented at the International Workshop on QSAR in Environmental Toxicology, Duluth, MN., July 19-23, 1992. See also PB93-192631.

In the field of environmental toxicology, and especially aquatic toxicology, quantitative structure activity relationships (QSARs) have developed as scientifically-credible tools for predicting the toxicity of chemicals when little or not empirical data are available. A basic and fundamental understanding of toxicological principles has been considered crucial to the continued acceptance and application of these techniques as biologically relevant. As a consequence, there has been an evolution of QSAR development and application from that of a chemical-class perspective to one that is more consistent with assumptions regarding modes of toxic action. The assessment of a compound's likely mode of toxic action is critical for a correct QSAR selection; incorrect mode of action-based QSAR selections can result in 10- to 1000-fold errors in toxicity/predictions. (Copyright (c) 1994 Gordon and Breach Science Publishers S.A.)

Keywords: *Toxicity, *Fishes, *Water pollution effects(Animals), Aquatic animals, Dose-response relationships, Marine biology, Hazardous materials, Exposure, Chemical properties, Biological effects, Predictions, Molecular structure, Mutagens, Carcinogens, Reprints, QSAR(Quantitative structure activity relationships).

PB94-176203/REB PC A03/MF A01
QSARs for Photoinduced Toxicity: 1. Acute Lethality of Polycyclic Aromatic Hydrocarbons to 'Daphnia magna'. Journal article.
Environmental Research Lab.-Duluth, MN.
O. G. Mekenyan, G. T. Ankley, G. D. Veith, and D. J. Call. c1994, 18p EPA/600/J-94/253
Pub. in Chemosphere, v28 n3 p567-582 1994. See also PB86-122496 and PB93-155950. Prepared in cooperation with Wisconsin Univ.-Superior. Lake Superior Research Inst. and Higher Inst. of Chemical Technology, Burgas (Bulgaria).

Research with a variety of aquatic species has shown that while polycyclic aromatic hydrocarbons (PAHs) are generally not acutely toxic in conventional laboratory tests, many are extremely toxic in the presence of sunlight. In an effort to develop a model for predicting which PAHs may exhibit photo-induced toxicity, Newsted and Giesy (1987) reported a parabolic relationship between the toxicity and the energy of the triplet state of a variety of PAHs. The authors have reexamined these data and propose a more mechanistic explanation for the prediction of photo-induced PAH toxicity. They sought a molecular descriptor which could be computed from structure rather than measured empirically.

Keywords: *Photochemical reactions, *Toxicity, *Polycyclic aromatic hydrocarbons, *Daphnia, Molecular structure, Physicochemical properties, Statistical analysis, Models, Exposure, Aquatic animals, Aquatic ecosystems, Ground state, Indexes(Ratio), Dosage, Lethality, Electromagnetic absorption, Hydrocarbons, Reprints, HOMO-LUMO(Highest Occupied Molecular Orbital-Lowest Unoccupied Molecular Orbital), Daphnia magna, QSAR(Quantitative Structure Activity Relationships).

PB94-176211/REB PC A04/MF A01
North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.
Blue Crab, 'Callinectes sapidus', Hemocyanin Concentrations as an Indicator of Environmental Conditions in the Albemarle/Pamlico Estuary. Final rept.
National Marine Fisheries Service, Beaufort, NC. Beaufort Lab.
D. W. Engel, M. Brouwer, J. B. Stevens, and E. J. Noga. 1992, 64p APES-92-09
Prepared in cooperation with Duke Univ., Beaufort, NC. Marine Lab. and North Carolina State Univ. at Raleigh. Coll. of Veterinary Medicine. Sponsored by North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study. and Environmental Protection Agency, Research Triangle Park, NC. National Estuary Program.

This report is an investigation of the effects of environmental quality on blue crabs using hemolymph hemocyanin concentrations as an indicator of crab fitness. Blue crab samples were collected at predetermined sites in the Albemarle/Pamlico (NC) study area and in the southeastern part of the state. It was concluded that there is no direct correlation between contaminant accumulation and either depressed hemocyanin concentrations or shell disease among the blue crabs from the Pamlico and Neuse rivers.

Keywords: *Biological indicators, *Albemarle-Pamlico Estuary, *Environmental quality, *Water pollution effects(Animals), *Bioaccumulation, *Hemocyanin, North Carolina, Aquatic ecosystems, Marine animals, Crabs, Pamlico River, Temporal distribution, Environmental surveys, Shellfish, Concentration(Composition), Spatial distribution, *Blue crabs, Southeast Region(North Carolina).

PB94-176534/REB PC A08/MF A02
Draft Manual of Practice Identification of Illicit Connections.
Environmental Protection Agency, Washington, DC. Office of Water.
Sep 90, 168p EPA/833/R-90/100

The purpose of the manual is to present a procedure for the identification of illicit connections into storm drainage systems. The manual takes two perspectives: (1) that of evaluating which industrial facility discharges non-storm water to a separate storm sewer system serving multiple facilities; and (2) that of evaluating a targeted facility for non-storm discharges to separate storm sewers. The goal to ensure that storm drainage systems do not receive non-storm water or other non-permitted discharges. The intended use for the manual is by regulatory or industrial personnel.

Keywords: *Water pollution sources, *Site investigations, *Law enforcement, Water pollution detection, Inspection, Outfall sewers, Storm sewers, Runoff, Water treatment, Storm drains, Water pollution control, Sanitary engineering, Industry, Industrial wastes, Waste water, Discharge(Water), Sampling, Pollution regulations, Manuals.

PB94-176617/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Field Test of a Generic Method for the Sampling and Analysis of Halogenated Hydrocarbons Listed in Title III of the Clean Air Act Amendments of 1990. Rept. for Jan 92-Dec 93.
Radian Corp., Research Triangle Park, NC.
J. F. McGaughey, J. T. Bursey, J. Rice, R. G. Merrill, and M. D. Jackson. 1993, 14p EPA/600/A-94/094
Contract EPA-68-D1-0010
See also PB87-168688, PB91-145979, PB91-216184, PB93-212181, PB93-227163 and PB93-227171. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

To validate a new source test method for EPA use, the performance of the sampling and analytical methodology for the chemicals of interest must be established and demonstrated through field tests at sources similar to those of interest. Validation studies for measuring volatile and semi-volatile halogenated organics were undertaken in two different studies. Repeated sampling runs of the Volatile Organic Sample Train (VOST; SW-846 Sampling Method 0030 with Analytical Method 5041) and Semi-Volatile Organic Sample Train (Semi-VOST; SW-846 Method 0010 with Analytical Method 8270) were collected at two source locations. Quadruple sampling trains were used in each run, with two of the trains being spiked with standards. For the VOST method, the results of the two field studies were consistent with laboratory tests. For the Semi-VOST method, consistent results were obtained in the laboratory study and one of the field tests. At the second field site, the Semi-VOST data were inadequate because of problems encountered in preparation of the samples for analysis.

Keywords: *Air pollution sampling, *Chemical analysis, *Halogenated hydrocarbons, Field tests, Emission factors, Statistical analysis, Analytical techniques, Design criteria, Test methods, Sample preparation, Precision, Validation, Bias, Quality assurance, Stack gases, Fossil-fuel power plants, Reprints, EPA Method 301, VOST(Volatile Organic Sampling Train), Volatile organic compounds, Clean Air Act Amendments of 1990.

PB94-176625/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Sensitivity of the Regional Oxidant Model to Meterological Parameters. Interim rept. Mar 92-Nov 93.
MCNC, Research Triangle Park, NC. Information Technologies Div.
D. T. Olerud, T. E. Pierce, K. L. Schere, and A. F. Hanna. 1993, 17p EPA/600/A-94/096
See also PB83-207688, PB91-171926, PB91-171934 and PB92-192202. Presented at the AWMA International Conference on Regional Photochemical Measurement and Modeling Studies, La Jolla, CA., November 8-12, 1993. Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Air Resources Lab.

A variety of non-emissions-related sensitivity and shock tests are performed on the Regional Oxidant Model (ROM) version 2.2, a regional-scale, three-layer, Eulerian-grid air quality model. Variables perturbed include the initial conditions, boundary conditions, cloud transmissivities, horizontal diffusivities, layer heights, temperature, deposition velocity, and vertical fluxes. The sensitivity tests fall into three groups: (1) boundary-conditions-related tests, (2) layer-related tests, and (3) miscellaneous meteorological tests. The authors find that the ROM2.2 is particularly sensitive to perturbations in the height of layer 2 and in cloud transmissivity. Perturbations in deposition velocity, upper boundary conditions, layer 1 heights, temperature, and vertical fluxes can also produce significant changes in model predictions. Lateral boundary conditions and initial conditions play relatively minor roles in the model predictions for more polluted areas.

Keywords: *Ozone, *Air pollution dispersion, *Meteorological data, Atmospheric diffusion, Mathematical models, Three-dimensional calculations, Atmospheric models, Photochemistry, Atmospheric chemistry, Air temperature, Air pollution monitoring, Spatial distribution, Wind velocity, Wind direction, Boundary layer stability, Boundary conditions, Atmospheric boundary layer, Sensitivity, Reprints, *Regional Oxidant Model.

PB94-176633/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Comparison of a Modified VOST Sampling Method to Method 0030. Rept. for Jun 92-Dec 93.
Radian Corp., Research Triangle Park, NC.
J. F. McGaughey, J. T. Bursey, R. G. Merrill, M. D. Jackson, and L. D. Johnson. Dec 93, 12p EPA/600/A-94/097
Contract EPA-68-D1-0010
See also PB84-234525, PB91-145979, PB93-212181, PB93-227163 and PB93-227171. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

A laboratory and field test were performed to select and evaluate possible replacement sorbents for sampling volatile organic compounds in stationary sources using SW-846 Method 0030. On the basis of laboratory results, Anasorb 747 was selected for testing in the field using dynamic spiking procedures. This modification of the VOST method uses a single tube containing Anasorb 747 that is preceded by two tubes containing Tenax. The modified VOST method was compared in the field with the VOST method using traditional adsorbents. Both the VOST and modified VOST used a quadruple probe and four similar sampling trains, using the same certified compressed gas cylinder as a source of test compounds. As a general observation, the recovery and precision of most compounds is improved by using the modified VOST procedure.

Keywords: *Air pollution sampling, *Chemical analysis, Field tests, Charcoal, Stationary sources, Emission factors, Statistical analysis, Analytical techniques, Design criteria, Sample preparation, Test methods, Validation, Bias, Quality assurance, Precision, Reprints, *Volatile organic compounds, EPA Method 0030, VOST(Volatile Organic Sampling Train), Anasorb 747, Spiking, Clean Air Act Amendments of 1990.

PB94-176641/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Preparation of the Components of the Modified Method 5 (Method 0010) Sampling Train for Analysis by SW-846 Method 8270. Rept. for Dec 92-Dec 93.
Radian Corp., Research Triangle Park, NC.
J. F. McGaughey, R. G. Merrill, J. T. Bursey, D. E. Wagoner, and M. D. Jackson. Dec 93, 13p EPA/600/A-94/098
Contract EPA-68-D1-0010
See also PB93-212181, PB93-227163 and PB93-227171. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

In a field evaluation study for semivolatile halogenated organic compounds listed in Title III of the Clean Air Act Amendments of 1990, dynamic spiking experiments using a liquid solution were performed in the field. Two of four quadruple sampling trains were spiked for eight sampling runs. Method 0010 train components were prepared and analyzed in three parts: filter/front halt rinse, XAD-2 resin, and condensate/condensate rinse. Because the results were at variance with results obtained for analytes spiked in laboratory studies and a previous field study, the sample preparation process was investigated in detail. Sample preparation procedures had followed Method 0010, but use of some procedures which were not specifically prohibited by Method 0010 had depressed compound recoveries. To ensure that the sample preparation procedures for Method 0010 train components were clear and unambiguous, a new protocol to address preparation of Method 0010 train components for Method 8270 analysis was written.

Keywords: *Air pollution sampling, *Chemical analysis, *Halogenated hydrocarbons, Field tests, Boilers, Stationary sources, Emission factors, Statistical analysis, Analytical techniques, Design criteria, Test methods, Sample preparation, Precision, Validation, Bias, Quality assurance, Reprints, EPA Method 5, EPA Method 0010, SW-846 Method 8270, SemiVOST(Semi-volatile Organic Sampling Train), Semivolatile organic compounds, Clean Air Act Amendments of 1990.

PB94-176658/REB PC **A02**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Overview of PAMS Meteorological Monitoring Requirements.
National Oceanic and Atmospheric Administration, Silver Spring, MD. Atmospheric Sciences Modeling Div.
G. H. Crescenti. 1994, 10p EPA/600/A-94/099
See also PB92-122795. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The Photochemical Assessment Monitoring Station (PAMS) requires the incorporation of surface and upper air meteorological instrumentation. The platform for the surface instrumentation is a 10 m tower. The variables to be collected include horizontal wind speed, horizontal wind direction, air temperature, relative humidity, solar radiation, and barometric pressure. Upper air data may be acquired using a variety of platforms which include aircraft, tall towers, tethered and expendable radiosondes, and ground-based remote profilers. The variables to be collected include profiles of horizontal wind speed and direction, vertical wind speed, and air temperature. In addition, the mixing layer height should be determined from the upper air data. This paper summarizes the meteorological sensor requirements for PAMS which are not specifically addressed in the Code of Federal Regulations (40 CFR Part 58).

Keywords: *Ozone, *Air pollution monitoring, *Meteorological data, Photochemical reactions, Mathematical models, Air temperature, Boundary layer flow, Atmospheric pressure, Atmospheric chemistry, Humidity, Mixing height, Wind velocity, Wind direction, Regulations, Standards, Requirements, Reprints, PAMS(Photochemical Assessment Monitoring Station).

PB94-176948/REB PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Field Tests of Chloroform Collection/Analysis Methods. Final project rept. Oct 91-Sep 93.
Research Triangle Inst., Research Triangle Park, NC.
W. C. Eaton, L. B. Jaffe, E. E. Rickman, R. K. M. Jayanty, and L. Grosshandler. Jun 94, 51p EPA/600/R-94/082
Contract EPA-68-D1-0009
Prepared in cooperation with Entropy Inc., Research Triangle Park, NC. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The Clean Air Act Amendments of 1990 call for the regulation of numerous toxic chemical species emitted from stationary sources. One of the toxic species is chloroform, an organic compound emitted from paper mills employing the chlorine/chlorine dioxide bleaching process. Two candidate methods were field tested for the collection and analysis of chloroform. Collection efficiencies of a Tedlar bag method and a charcoal adsorbent tube method were compared. Samples from each method were collected from the hypochlorite tower vent (300 ppm chloroform source) of a paper mill bleach plant in South Carolina. Results from a number of laboratory studies and field testing of the methods are discussed. The precision of both methods was found to be acceptable. The bias and precision of the revised charcoal tube method were found to be acceptable per EPA Method 201 specifications. The revised charcoal tube method is recommended for the collection and analysis of chloroform emissions from stationary sources.

Keywords: *Paper mills, *Air pollution monitoring, *Choloform, Papermaking, Air pollution sampling, Chemical analysis, Analytical methods, Collection methods, Test methods, Field tests, Pollution regulations, Toxic substances.

PB94-177128/REB PC **A17**/MF **A03**
Control of Volatile Organic Compound Emissions from Batch Processes. Alternative Control Techniques Information Document. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards. Feb 94, 379p EPA/450/R-94/020

The purpose of this document is to provide information on alternative control techniques for volatile organic compound (VOC) emissions from batch operations. Although the control techniques information applies to batch processing in all industries, the document focuses primarily on batch processes in the following six industries: plastic materials and resins (described by Standard Industrial Classification (SIC) Code 2821), pharmaceuticals (SIC 2833 and 2834), gum and wood chemicals (SIC 2861), cyclic crudes and intermediates (SIC 2865), industrial organic chemicals (2869), and agricultural chemicals (SIC 2879). The document contains information on emissions, controls, control options, and costs that States can use in developing rules based on reasonably available control technology.

Keywords: *Air pollution control, *Batch processing, Chemical plants, Exhaust emissions, Emission factors, Alternatives, Pollution regulations, Standards compliance, Environmental impacts, Cost analysis, State government, *Volatile organic compounds.

PB94-177177/REB PC **A21**/MF **A04**
Alternative Control Techniques Document: NOx Emissions from Industrial/Commercial/Institutional (ICI) Boilers.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards. Mar 94, 477p EPA/453/R-94/022

Industrial, commercial, and institutional (ICI) boilers have been identified as a category that emits more than 25 tons of oxides of nitrogen (NOx) per year. This alternative control techniques (ACT) document provides technical information for use by State and local agencies to develop and implement regulatory programs to control NOx emissions from ICI boilers. Additional ACT documents are being developed for other stationary source categories. Chapter 2 summarizes the findings of this study. Chapter 3 presents information on the ICI boiler types, fuels, operation, and industry applications. Chapter 4 discusses NOx formation and uncontrolled NOx emission factors. Chapter 5 covers alternative control techniques and achievable controlled emission levels. Chapter 6 presents the cost and cost effectiveness of each control technique. Chapter 7 describes environmental and energy impacts associated with implementing the NOx control techniques. Finally, Appendices A through G provide the detailed data used in this study to evaluate uncontrolled and controlled emissions and the costs of controls for several retrofit scenarios.

Keywords: *Air pollution control, *Boilers, *Nitrogen oxides, Alternatives, Flue gases, Combustion products, Combustion efficiency, Combustion control, Industrial plants, Boiler furnaces, Fossil-fuel power plants, Cost analysis, Cost effectiveness, Economic impact, Environmental impacts.

PB94-177185/REB PC **A09**/MF **A02**
Regulatory Impact Analysis for the National Emissions Standards for Hazardous Air Pollutants for Source Categories: Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry and Other Processes Subject to the Negotiated Regulation for Equipment Leaks. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards. Mar 94, 177p EPA/453/R-94/019

Table of Contents:

Background;
The Proposed Hazardous Organic NESHAP (HON) Emissions Standards in Brief;
The Need for and Consequences of Regulatory Action (Economic, Energy and Environmental Consequences);
Control Techniques (Combustion Technology;
Product Recovery Devices;
Leak Detection and Repair (LDAR);
and Internal Floating Roofs);
Regulatory Options;
Control Cost and Cost Effectiveness Analysis;
Economic Impact Analysis;
Benefits (Hazardous Air Pollutants;
Ozone;
and Particulates);
and Weighing the Benefits and the Costs.

Keywords: *Air pollution standards, *Organic chemicals industry, *Leaks, Air pollution control, Flares, Chemical reactors, Chemical plants, Boilers, Incinerators, Pollution regulations, Exhaust emissions, Combustion efficiency, Leakage, Synthetic materials, Economic impact, Cost analysis, *Regulatory impact analysis, National Emission Standards for Hazardous Air Pollutants, Clean Air Act Amendments of 1990.

PB94-177193/REB PC **A08**/MF **A02**
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Chesapeake Bay Atmospheric Deposition Study Phase 1: July 1990-June 1991 Appendices.
Maryland Dept. of Natural Resources, Annapolis. Chesapeake Bay Research and Monitoring Div.
Mar 94, 156p CBRM-AD-93-5/2, CBP/TRS-105/94
See also PB94-178274. Sponsored by Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.

A one-year study (6/90-7/91) was conducted to estimate the deposition of atmospheric contaminants to the Maryland portion of the Chesapeake Bay. The studied contaminants included the trace elements polychlorinated biphenyl (PCBs) congeners, and polycyclic aromatic hydrocarbons (PAHs). Weekly integrated samples of aerosol and precipitation were collected for elemental constituents at two sites, one on the northeastern (Wye) and one on the mid-bay western (Elms) Maryland shore. Organic contaminants in precipitation samples were collected bi-weekly at the Elms site only. Major elements in wet deposition, as related to acid rain monitoring, are being measured at these sites by other groups.

Keywords: *Chesapeake Bay, *Acid rain, *Air pollution effects, *Water pollution sampling, Trace elements, Organic compounds, Heavy metals, Precipitation(Meteorology), Atmospheric chemistry, Water chemistry, Aerosols, Path of pollutants, Environmental transport, Maryland, Graphs(Charts), CBADS(Chesapeake Bay Atmospheric Deposition Study).

PB94-177292/REB PC **A05/MF A01**
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Chesapeake Bay Benthic Community Restoration Goals.
Versar, Inc., Columbia, MD.
J. A. Ranasinghe, S. B. Weisberg, D. M. Dauer, L. C. Schaffner, and R. J. Diaz. Dec 93, 91p
Contracts EPA-68-D9-0166, MDNR-CB92-006-004
Prepared in cooperation with Old Dominion Univ., Norfolk, VA. Dept. of Biological Sciences. and Virginia Inst. of Marine Science, Gloucester Point. Sponsored by Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program. and Maryland Dept. of Natural Resources, Annapolis. Chesapeake Bay Research and Monitoring Div.

The report describes an effort to define the expectations for benthic communities in nondegraded bottom habitats of the Chesapeake Bay. The specific objectives were to use existing data to establish expectations (restoration goals) for benthic communities in nondegraded bottom habitats of the Chesapeake Bay; develop an index that measures goal attainment; and identify areas in which future research may be helpful for refining, and decreasing uncertainty in, the identifed restoration goals. The report describes development of the Chesapeak Bay Benthic Community Restoration Goals, and a Restoration Goal Index (RGI) that can be used to assess whether goals are being met. The approach used to develop the goals and the index, and the results of analytical efforts, are detailed in Chapter II. A discussion of results and recommendations for the future are presented in Chapter III.

Keywords: *Chesapeake Bay, *Water pollution control, *Benthos, Biological communities, Aquatic ecosystems, Biological indicators, Estuaries, Water pollution effects, Water pollution monitoring, Goals, Chesapeake Bay Program.

PB94-177425/REB PC **A03/MF A01**
Environmental Protection Agency, Washington, DC. Office of Drinking Water.
National Statistical Assessment of Rural Water Conditions. Executive Summary.
Cornell Univ. Agricultural Experiment Station, Ithaca, NY. Dept. of Rural Sociology.
J. D. Francis, B. L. Brower, W. F. Graham, O. W. Larson, and J. L. McCaull. Jun 84, 36p EPA/570/9-84/003
See also PB88-213517. Sponsored by Environmental Protection Agency, Washington, DC. Office of Drinking Water.

The report presents the findings of a national research survey of rural household water conditions. The purpose of the study was to gather information about the quantity, quality, availability, and cost of water supplies in rural America.

Keywords: *Water quality, *Rural areas, *United States, Water supply, Water systems, Water pollution, Water wells, Water analysis, Water utilization, Quantity, Demography, Availability, Cost analysis, Economic factors, Statistical analysis, National Statistical Assessment of Rural Water Conditions.

PB94-177441/REB PC **A07/MF A02**
Guidelines for PM-10 Sampling and Analysis Applicable to Receptor Modeling.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Mar 94, 141p EPA/452/R-94/009

Chemical characterization of suspended particles is necessary, along with the application of receptor models, to apportion ambient concentrations to their sources for the development of emissions reduction strategies. This document identifies current technology for the sampling and analysis of PM-10 and its chemical constituents on filter deposits.

Keywords: *Air pollution sampling, *Chemical analysis, *Particles, Total suspended particulates, Smoke, Aerosols, Emissions, Combustion products, Air pollution sources, Stationary sources, Air pollution dispersion, Air filters, Pollution regulations, Guidelines, Receptor modeling, PM-10, Fugitive emissions, Fugitive dust.

PB94-177458/REB PC **A06/MF A02**
Economic Impact Analysis for the Polymers and Resins II NESHAP. Draft rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Jul 94, 108p EPA/453/R-94/034

Table of Contents:
- Economic Impact Analysis;
- Introduction;
- Overview of Economic Impact Analysis;
- Industry Profile;
- Primary Economic Impacts and Capital Availability Analysis;
- Secondary Economic Impacts;
- Potential Small Business Impacts;
- Economic Costs;
- Affected Plants and Emission Control Costs;
- Technical Description of Analytical Methods;
- Estimation of Industry Supply and Demand; and Sensitivity Analyses.

Keywords: *Epoxy resins, *Polyamide resins, *Air pollution control, *Economic impact, Plastics industry, Chemical industry, Air pollution economics, Air pollution standards, Pollution regulations, Cost analysis, Economic analysis, Epichlorhydrin, Wet strength, *National Emission Standards for Hazardous Air Pollutants, Clean Air Act Amendments of 1990, SIC 2821, Diglycidyl ether of Disphenol A.

PB94-177482/REB PC **A05/MF A02**
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Screening of Candidate Species for Development of Standard Operating Procedures for Aquatic Toxicity Testing with Resident Chesapeake Bay Biota. Final rept.
Maryland Univ., Queenstown. Wye Research and Education Center.
M. C. Ziegenfuss, and L. W. Hall. Mar 94, 98p CBP/TRS-103/94
See also PB93-165637. Sponsored by Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.

The goal of this study was to evaluate 25 resident Chesapeake Bay species (vertebrates, invertebrates and plants) as potential candidates for future Standard Operating Procedures (SOP) development for estuarine water column toxicity tests. Candidate species were considered for the following types of toxicity tests: effluent toxicity tests (species needed year round); ambient toxicity tests (species needed approximately once per season) and single chemical toxicity tests (species needed much less frequently than the above two types of tests). Candidate species for future SOP development were evaluated by using the following criteria: ecological significance to Chesapeake Bay; feasibility of culturing and testing year round; and sensitivity to toxic chemicals. The two species recommended for future SOP development are the copepod, Eurytemora affinis and the sago pondweed, Potamogeton pectinatus.

Keywords: *Toxicity, *Water pollution effects, *Chesapeake Bay, *Biota, *Biological indicators, *Estuaries, Aquatic ecosystems, Toxic substances, Marine biology, Criteria, Sensitivity, Biological effects, *Standard operating procedures, Eurytemora affinis, Potamogeton pectinatus.

PB94-177508/REB PC **A03/MF A01**
Guidance for the Determination of Appropriate Methods for the Detection of Section 313 Water Priority Chemicals.
Environmental Protection Agency, Washington, DC. Office of Water.
Apr 94, 50p EPA/833/B-94/001

Facilities covered by EPA's baseline NPDES general permit for storm water discharges associated with industrial activity which are subject to reporting requirements under EPCRA Section 313 for chemicals classified as 'water priority chemicals' must monitor their storm water discharges for those compounds. The document lists the Water Priority Chemicals and corresponding methods of analysis. The list contains 234 compounds. Under EPA regulations at 40 CFR Part 122 facilities required to sample their storm water discharges must use an approved method described in 40 CFR Part 136 (Guidelines Establishing Test Procedures for the Analysis of Pollutants). These EPA approved methods are indicated by bold and italicized text.

Keywords: *Storm water runoff, *Water pollution detection, *Analytical methods, Reporting requirements, Pollution regulations, Water analysis, Water pollution monitoring, Permits, Chemical compounds, Industrial wastes, Waste water, Alternatives, Tables(Data), *Priority pollutants, NPDES(National Pollutant Discharge Elimination System).

PB94-177516/REB PC **A03/MF A01**
Environmental Protection Agency, Washington, DC. Safety, Health and Environmental Management Div.
Development of Quantitative Containment Performance Tests for Laboratory Fume Hoods.
Rept. for 4 Sep 80-20 Jun 82.
CLV Industries, Inc., Cambridge, MA.
R. I. Chamberlin, and J. E. Leahy. 29 Jun 82, 36p
Contract EPA-68-01-6197
See also DE88005014. Sponsored by Environmental Protection Agency, Washington, DC. Safety, Health and Environmental Management Div.

An extensive review and study of available equipment, materials, and procedures was conducted to develop an alternate testing method for evaluating laboratory fume hood performance. The equipment investigated included photo-ionization, infrared, gas chromatographic, and fluorimetric types. A sulfur system was designed employing a commercially available Leakmeter and sulfur hexafluoride as the tracer gas. The procedure is recommended for application as a 'Pre-Purchase' requirement, and when properly adapted will assure only properly designed units are obtained. Of prime importance is the applicability to all types of hoods from basic to auxiliary supply air models and all aerodynamic features can be evaluated. Hood losses, well below the tolerable limits can be detected, and capture efficiencies of auxiliary air models accurately defined.

Keywords: *Performance tests, *Fume hoods, Laboratory equipment, Gaseous wastes, Ventilation, Laboratories, Containment systems, US EPA, Tracer techniques, Sulfur hexafluoride, Leak detectors.

PB94-177557/REB PC **A03/MF A01**
Chesapeake Bay Red Drum Fishery Management Plan. Agreement Commitment Report 1993.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Apr 94, 40p CBP/TRS-111/94

Partial Contents:
- Executive Summary;
- Introduction;
- Section 1. Background;
- Life History;
- FMP Status and Management Unit;
- Fishery Parameters;
- Biological Profile;
- Habitat Issues;
- The Fisheries;
- Laws and Regulations;
- Section 2. Red Drum Management;
- Goals and Objectives;
- Problem Areas and Management Strategies;
- Appendix:
- Implementation Plan Matrix; and Figures.

Keywords: *Marine fishes, *Marine biology, *Fish management, *Chesapeake Bay, Life cycles, History, Habitats, Proposals, Agreements, Maryland, Virginia, Commercial fishing, Sport fishing, Guidelines, Harvesting, Economic factors, Water pollution, Law(Jurisprudence), *Red Drum landings, Overfishing.

PB94-177565/REB PC A04/MF A01
OAQPS Control Cost Manual (Fourth Edition), Supplement 3. Chapter 10. Hoods, Ductwork, and Stacks. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
W. M. Vatavuk. Mar 94, 64p* EPA/450/3-90/006C
See also PB93-138147.

This is the third supplement to the OAQPS Control Cost Manual (Fourth Edition). The supplement consists of a new chapter, Chapter 10 ('Hoods, Ductwork, and Stacks'). Like the other Manual chapters, Chapter 10 is self-contained. It discusses: (1) the types of hoods, ductwork, and stacks used to support add-on air pollution control devices; (2) the theory underlying their operation and design; (3) basic sizing procedures; (4) procedures and current data for estimating capital and annual costs; and (5) several example problems that illustrate the various sizing and costing procedures. Chapter 10 also contains a table of contents and a list of references.

Keywords: *Gaseous wastes, *Air pollution control equipment, *Air pollution economics, *US EPA, Operating costs, Capitalized costs, Design criteria, Fume hoods, Ducted bodies, Stacks, Performance evaluation, Maintenance management, Ductwork.

PB94-177607/REB PC A09/MF A02
Locating and Estimating Air Emissions from Sources of Toluene.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Mar 94, 188p EPA/454/R-93/047

Table of Contents:
- Purpose of Document;
- Overview of Document Contents;
- Background;
- Emissions from Toluene Producton;
- Emissions from Major Uses of Toluene;
- Emissions from the Use of Toluene-Containing Materials;
- By-Product Emissions, Processes Unrelated to Production or Use of Toluene;
- Ambient Air and Stationary Source Test Procedures;
- Potential Source Categories of Toluene Emissions;
- Lists of Paint, Ink, and Printing Facilities with Annual Sales Greater Than $1 Million;
- Toluene Source Categories in Surface Coating Operations;
- and Summary of Emission Factors Listed In This Document.

Keywords: *Toluene, *Air pollution sources, Air pollution monitoring, Emission factors, Production, Chemical plants, Industrial plants, Materials handling, Utilization, Byproducts, Point sources, Stationary sources, Sectoral analysis, Chemical analysis, *Emission inventories, Fugitive emissions, CAS 108-88-3.

PB94-177714/REB PC A03/MF A01
Respiratory-Cardiovascular Physiology and Chloroethane Gill Flux in the Channel Catfish 'Ictalurus punctatus'. Journal article.
Environmental Research Lab.-Duluth, MN.
J. M. McKim, J. W. Nichols, G. J. Lien, and S. L. Bertelsen. c1994, 21p EPA/600/J-94/247
Pub. in Jnl. of Fish Biology, v44 p527-547 1994. Prepared in cooperation with AScI Corp., Duluth, MN.

A fish respirometer-metabolism chamber was used to obtain in vivo respiratory-cardiovascular and chloroethane gill flux data on transected channel catfish (Ictalurus punctatus). Methods used for spinal transection, attachment of an oral membrane (respiratory mask), placement and attachment of blood cannulas and urine catheters are described. Respiratory physiology, cardiac output and chemical extraction efficiencies for 1,1,2,2-tetrachloroethane (TCE), pentachloroethane (PCE), and hexachloroethane (HCE) were determined on 419-990 g catfish. Physiological measurements taken at 24 h were not significantly different from those taken at 48 h and indicated no deterioration of the in vivo preparation. All of these values agreed well with literature values on untransected channel catfish, except for Hct which was lower for cannulated animals used in this study. Overall, these data provide strong support for the use of transected channel catfish for in vivo collection of physiological and chemical gill flux data.

Keywords: *Water pollution effects(Animals), *Gills, *Chloroethanes, *Cardiovascular system, Physiology, Toxicology, In vivo analysis, Oxygen, *Foreign technology, *Ictalurus punctatus, *Channel catfish, Respirometer-metabolism chamber.

PB94-177722/REB PC A02/MF A01
Environmental Research Lab.-Duluth, MN.
Identification of Predominant Environmental Factors Structuring Stream Macroinvertebrate Communities Within a Large Agricultural Catchment. Journal article.
Minnesota Univ.-Duluth. Natural Resources Research Inst.
C. Richards, G. E. Host, and J. W. Arthur. c1993, 10p EPA/600/J-94/246
Grant EPA-R-814950
Pub. in Freshwater Biology, v29 p285-294 1993. Sponsored by Environmental Research Lab.-Duluth, MN.

Patterns of macroinvertebrate community composition were examined in streams within a 40,000-sq km catchment in central Michigan, U.S.A., to identify the major environmental gradients influencing community variation. Agriculture and associated clay and sandy soils predominated in much of the region. The objective of the present study was to quantify variation in composition and abundance of stream macroinvertebrate fauna within a large agricultural catchment in terms of environmental variation in water quality and stream habitat features. The intent was to determine whether particular classes of environmental variables (habitat or chemical) account for a significant proportion of variability in community composition.

Keywords: *Invertebrates, *Streams, *Catch basins, *Environmental impacts, *Water pollution effects, Agriculture, Habitats, Soil properties, Chemical analysis, Benthos, Nutrients, Nitrogen oxides, Phosphorus, Substrates, Michigan, Sites, Reprints, *Macroinvertebrates, Plecoptera, Ephemeroptera, Trichoptera.

PB94-177730/REB PC A03/MF A01
Use of the Aquatic Oligochaete 'Lumbriculus variegatus' for Assessing the Toxicity and Bioaccumulation of Sediment-Associated Contaminants. Journal article.
Environmental Research Lab.-Duluth, MN.
G. L. Phipps, G. T. Ankley, D. A. Benoit, and V. R. Mattson. c1993, 11p EPA/600/J-94/245
Pub. in Environmental Toxicology and Chemistry, v12 p269-279 1993.

In the paper the authors describe test methods utilizing the aquatic oligochaete Lumbriculus variegatus to assess the acute and chronic toxicity and the presence of bioaccumulatable compounds in contaminated sediments. Lumbriculus variegatus was chosen as a test species because (1) it represents an ecologically relevant component of freshwater ecosystems (i.e., oligochaetes); (2) it is suitable for long-term testing and evaluation of chronic toxicity end points (e.g., growth, reproduction); (3) it is exposed via all important routes of concern, including ingestion of contaminated particles; and (4) it has sufficient biomass to assess bioaccumulation of contaminants. Also, Lumbriculus variegatus is easily cultured and handled. Described herein are culturing procedures and test protocols (e.g., test length, sample size, feeding, etc.) for Lumbriculus variegatus, as well as two examples of the types of experimental data generated when using the oligochaete in tests with contaminated sediments. (Copyright (c) 1993 Pergammon Press Ltd.)

Keywords: *Sediments, *Oligochaetes, *Toxicity, Invertebrates, Bioaccumulation, Ecosystems, Chronic exposure, Cultures(Biology), Test methods, Water pollution, Benthos, Reprints, Lumbriculus variegatus.

PB94-177748/REB PC A02/MF A01
Coplanar PCB and Metal Residues in Dolphins from the U.S. Atlantic Coast Including Atlantic Bottlenose Dolphin Obained during the 1987/88 Mass Mortality. Journal aritcle.
Environmental Research Lab.-Duluth, MN.
D. W. Kuehl, R. Haebler, and C. Potter. c1994, 9p EPA/600/J-94/244
Pub. in Chemosphere, v28 n6 p1245-1253 1994. Prepared in cooperation with Smithsonian Institution, Washington, DC. Museum of Natural History.

Bottlenose dolphins (Tursiops truncatus) collected during the 1987/88 mass mortality event along the Atlantic coast of the United States have been analyzed for coplanar PCBs Numbers 77, 105, 126 and 169 in blubber, and for the metals Hg, Pb, Cd, Mn, and Cr, and the non-metallic element Se in liver. Results have been compared to two reference species, common (Delphinus delphis) and white-sided (Lagenorhynchus acutus) dolphins. Mercury concentrations in all animals studied correlated with selenium concentrations ($r=0.86$) at a 1:1 mole ratio, indicating that selenium may protect these animals from mercury toxicity.

Keywords: *Mortality, *Dolphins(Mammals), *Water pollution effects(Mammals), Toxicity, Metals, Concentration(Composition), Polychlorinated biphenyls, Cetacea, Residues, Mercury(Metal), Selenium, Lead(Metal), Manganese, Cadmium, Chromium, Marine mammals, Reprints, Atlantic Coast(United States), Stranding, Tursiops truncatus, Delphinus delphis, Lagenorhynchus acutus, TEC(Toxic equivalent concentrations).

PB94-177755/REB PC A06/MF A02
Environmental Monitoring Systems Lab., Las Vegas, NV.
Environmental Monitoring and Assessment Program: Agroecosystem Pilot Field Program Report, 1992.
Agricultural Research Service, Raleigh, NC.
C. L. Campbell, J. M. Bay, A. S. Hellkamp, G. R. Hess, and M. J. Munster. May 94, 121p EPA/620/R-94/014
See also PB94-121837 and PB94-160694. Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

The mission of the Agroecosystem Resource Group (ARG) of the Environmental Monitoring and Assessment Program (EMAP) is to develop and implement a program that will, in the long term, monitor and assess the condition and extent of the nation's agroecological resources from an ecological perspective through an interagency process.

Keywords: *Environmental monitoring, *Agricultural economics, *Farm crops, *Ecosystems, *Water quality, Statistical analysis, Production, Soil properties, Biological indicators, Fertilizers, Pesticides, Harvesting, Trends, Land use, Evaluation, Topography, Quality assurance, Tables(Data).

PB94-177763/REB PC A02/MF A01
Environmental Chemistry of Chromium. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
S. Krishnamurthy, and M. M. Wilkens. 1994, 6p EPA/600/J-94/243
Pub. in Northeastern Geology, v16 n1 p14-17 1994.
See also PB85-115905 and PB86-134301.

Chromium is of great environmental concern because hexavalent chromium is a potent carcinogen. The health effects resulting from chromium exposure have received as much attention as those resulting from benzene or asbestos exposure. Although considered innocuous, Cr(III) can be mutagenic and genotoxic when inside the nuclei of cells in target organs. The paper discusses the various oxidation states of the metal in the environment, the interconversion of Cr(III) and CR(VI), the sources of chromium in the environment, and the transport of the metal in the media. Chromium's tendency to change oxidation states, in both environmental media and living cells, is emphasized. It is possible for Cr(VI)to become immobilized in aquifers in a solid phase as barium chromate. This may present a problem in remediation by 'Pump and Treat' technology if the solid phase cannot be easily solubilized. The microbial reduction of hexavalent chromium and bioremediation of chromium-contaminated soil, sediments, and aquifers is summarized.

Keywords: *Chromium, *Environmental health, *Hazardous materials, *Industrial hygiene, Toxicology, Oxidation, Chemical reactions, Reduction(Chemistry), Transport properties, Exposure, Carcinogens, Mutagens, Toxic substances, Water pollution, Soil pollution,

Air pollution, Chemical analysis, Reprints, Bioremediation, Hexavalent chromium.

PB94-177771/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Engineering Forum Issue: Considerations in Deciding to Treat Contaminated Unsaturated Soils In situ.
Battelle, Columbus, OH.
L. A. Smith. Dec 93, 27p EPA/540/S-94/500
Contract EPA-68-C0-0003
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The purpose of the document is to provide assistance in deciding in situ treatment of contaminated soils is a potentially feasible remedial alternative. Technical considerations that affect the decision to treat soils in situ are discussed. General factors which influence the selection of in situ treatment are hydrogeologic flow regime, regulatory standards, time available for remediation, removal logistics, and waste conditions. The document also provides information relevant to reviewing and screening in situ technologies. Factors important to the following in situ technologies are discussed: solidifcation/stabilization, soil vapor extraction, bioremediation, bioventing, vitrification, radio frequency heating, soil flushing, and steam injection and extraction. Systems for delivery and recovery of liquids, vapors, and energy to and from the subsurface are included.

Keywords: *Superfund, *Soils, *Contamination, *Solid waste treatment, In situ analysis, Solidification, Stabilization, Vitrification, Excavation, Flushing, Removal, Degradation, Heating, Injection, Steam, *Unsaturated soils, Vapor extraction.

PB94-177789/REB PC A20/MF A04
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.
Wildlife Exposure Factors Handbook. Appendix: Literature Review Database. Volume 2 of 2.
ICF Kaiser International, Inc., Fairfax, VA.
M. McVey, K. Hall, P. Trenham, A. Soast, and L. Frymier. Dec 93, 461p EPA/600/R-93/187B, , OHEA-E-391
Contracts EPA-68-C8-0003, EPA-68-D0-0101
See also PB94-174778. Sponsored by Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.

The Handbook provides information on various factors used to assess exposure to wildlife. The goals of the project are (1) to promote the application of risk assessment methods to wildlife species, (2) to foster a consistent approach to wildlife exposure and risk assessments, and (3) to increase the accessibility of the literature applicable to these assessments. The bulk of the document summarizes literature values for exposure factors for 34 species of birds, mammals, amphibians, and reptiles. In addition, the document contains a chapter on allometric equations that can be used to estimate some of the exposure factors when data are lacking and a description of some common equations used to estimate exposure.

Keywords: *Risk assessment, *Wildlife, *Exposure, *Reviews, Life cycles, Habitats, Tables(Data), Birds, Mammals, Amphibia, Reptiles, Species diversity, Age, Sex, Feeding stuffs, Seasonal variations, Animal migrations, Maturation, Reproduction(Biology), Equations, Water fowl.

PB94-178050/REB PC A02/MF A01
Proposed Regulations for Lead in Drinking Water, August 1988.
Environmental Protection Agency, Washington, DC. Office of Drinking Water.
Aug 88, 8p

The report provides an overview of how the proposed National Primary Drinking Water Regulations (NPDWRs) for controlling lead and water in drinking water will affect medium water systems.

Keywords: *Lead(Metal), Potable water, Water pipes, Water distribution, Distribution systems, Plumbing, Piping systems, Corrosion prevention, Demineralization, Copper, Requirements, Government policies, *National Primary Drinking Water Regulations, *Medium water systems.

PB94-178175/REB PC A05/MF A02
National Public Water System Supervision Program. FY 1993 Compliance Report.
Environmental Protection Agency, Washington, DC. Office of Water.
Mar 94, 78p EPA/812/R-94/001
See also PB93-180867.

The report gives information on the number of Public Water Systems, the source of their water, and the population served during FY 1993. Three types of Public Water Systems are covered: Community Water Systems, Nontransient Noncommunity Water Systems, and Transient Noncommunity Waste Systems.

Keywords: *Potable water, *Water quality standards, *Public utilities, *Water systems, Water utilities, Water distribution, Distribution systems, Water treatment, Contaminants, Regulations, Standards compliance, Law enforcement, Trends, National Drinking Water Program, Noncompliance, Nontransient noncommunity water systems, Transient noncommunity water systems, Community water systems.

PB94-178274/REB PC A08/MF A02
Maryland Dept. of Natural Resources, Annapolis. Chesapeake Bay Research and Monitoring Div.
Chesapeake Bay Atmospheric Deposition Study Phase 1: July 1990-June 1991.
Delaware Univ., Lewes. Coll. of Marine Studies.
J. E. Baker, T. M. Church, J. M. Ondov, J. R. Scudlark, and K. M. Conko. Dec 92, 174p CBP/TRS-104/94
Contracts CB90-002-004, PR90-003-004
See also PB94-108321 and Appendices, PB94-177193. Prepared in cooperation with Maryland Univ., Solomons. Chesapeake Biological Lab., Maryland Univ., College Park. Dept. of Chemistry and Biochemistry., and Maryland Univ., Queenstown. Wye Research and Education Center.

A one-year study (6/90-7/91) was conducted to estimate the deposition of atmospheric contaminants to the Maryland portion of the Chesapeake Bay. The studied contaminants included the trace elements polychlorinated biphenyl (PCBs) congeners, and polycyclic aromatic hydrocarbons (PAHs). Weekly integrated samples of aerosol and precipitation were collected for elemental constituents at two sites, one on the northeastern (Wye) and one on the mid-bay western (Elms) Maryland shore. Organic contaminants in precipitation samples were collected bi-weekly at the Elms site only. Major elements in wet deposition, as related to acid rain monitoring, are being measured at these sites by other groups.

Keywords: *Chesapeake Bay, *Acid rain, *Air pollution effects, *Water pollution sampling, Trace elements, Organic compounds, Heavy metals, Precipitation(Meteorology), Atmospheric chemistry, Water chemistry, Aerosols, Path of pollutants, Environmental transport, Maryland, Graphs(Charts), CBADS(Chesapeake Bay Atmospheric Deposition Study).

PB94-178282/REB PC A03/MF A01
General Circulation Model Output for Forest Climate Change Research and Applications. Forest Service general technical rept.
Southeastern Forest Experiment Station, Asheville, NC.
E. J. Cooter, B. K. Eder, S. K. LeDuc, and L. Truppi. 16 May 94, 45p FSGTR-SE-85
See also PB93-124626.

The report reviews technical aspects of and summarizes output from four climate models. Recommendations concerning the use of these outputs in forest impact assessments are made.

Keywords: *Climatic changes, *Forests, *Mathematical models, *Air pollution effects, General circulation models, Global warming, Carbon dioxide, Atmospheric temperature, Humidity, Soil properties, Topography, Cloud cover, Seasonal variations, Precipitation(Meteorology), Tables(Data), *Southern Region(United States).

PB94-178324/REB PC A10/MF A03
Guidance Manual for Developing Best Management Practices (BMP). Final rept.
Environmental Protection Agency, Washington, DC. Office of Water.
Oct 93, 202p EPA/833/B-93/004
See also PB90-256611.

Table of Contents:
Introduction to Best Management Practices (BMP);
BMP Plan Development;
Industry-Specific BMP (Metal Finishing;
Organic Chemicals, Plastics, and Synthetic Fibers Manufacturing;
Textiles Manufacturing;
Pulp and Paper Manufacturing;
Pesticides Formulation;
Pharmaceuticals Manufacturing;
Primary Metals Manufacturing;
Petroleum Refining;
and Inorganic Chemicals Manufacturing);
Resources Available for Determining BMP;
BMP Plan Development Checklists;
and Theoretical Decision-Making Process for BMP Plan Development.

Keywords: *Water pollution control, *Permits, Waste water, Water treatment, Water quality standards, Water pollution sources, Sectoral analysis, Industrial wastes, Pretreatment, Pollution regulations, Guidelines, *Best management practices, NPDES(National Pollutant Discharge Elimination System).

PB94-178621/REB PC A03/MF A01
Environmental Protection Agency, Denver, CO. Water Management Div.
Compliance Evaluation Inspection Report: Rocky Mountain Arsenal, Adams County, Colorado, NPDES No. CO-0021202. Final rept.
Science Applications International Corp., Denver, CO.
Sep 91, 20p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Water Management Div.

This presents the findings of a compliance evaluation inspection of the Rocky Mountain Arsenal in Adams County, Colorado, conducted on June 25, 1991. It is part of a series of inspections of municipal POTW dischargers.

Keywords: *Waste water treatment, *Municipal wastes, *Inspection, Water treatment, Water pollution control, Outfall, Runoff, Filtration, Chlorination, Settling basins, Permits, Requirements, Standards compliance, Recommendations, Site surveys, Colorado, Rocky Mountain Arsenal, Adams County(Colorado), POTW(Publicly Owned Treatment Works), NPDES(National Pollutant Discharge Elimination System).

PB94-178639/REB PC A03/MF A01
Environmental Protection Agency, San Francisco, CA. Region IX.
NPDES Compliance Monitoring Report: Paloverde Decline, Pima County, Arizona. Final rept.
Science Applications International Corp., Denver, CO.
W. Ganter. 7 Oct 92, 21p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, San Francisco, CA. Region IX.

This presents the findings of a compliance evaluation inspection of the Paloverde Decline in Pima County, Arizona, conducted on August 21, 1992. It is part of a series of inspections of uncontrolled discharges of mine drainage.

Keywords: *Acid mine drainage, *Storm water runoff, *Inspection, Water pollution monitoring, Water pollution control, Mine waters, Abandoned sites, Site surveys, Recommendations, Requirements, Standards compliance, Arizona, Pima County(Arizona), Paloverde Decline, Uncontrolled discharge, NPDES(National Pollutant Discharge Elimination System).

PB94-178647/REB PC A03/MF A01
Environmental Protection Agency, Denver, CO. Region VIII.
Compliance Evaluation Inspection Report: Silver Engineering Works, Aurora, Colorado. Final rept.
Science Applications International Corp., Denver, CO.
Jun 90, 25p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Region VIII.

This presents the findings of a compliance evaluation inspection of the Silver Engineering Works, Inc. in Aurora, Colorado, conducted on June 8, 1990. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Pulp mills, Paper making, Sugar industry, Industrial plants, Standards compliance, Storm water runoff, Site surveys, Permits, Waste storage, Waste processing, Requirements, Recommendations, Colorado, Aurora(Colorado), NPDES(National Pollutant Discharge Elimination System).

PB94-178654/REB PC **A03**/MF **A01**
Environmental Protection Agency, San Francisco, CA. Region IX.
NPDES Compliance Monitoring Report: Silver Bell Mine, Pima County, Arizona. Final rept.
Science Applications International Corp., Denver, CO.
W. Ganter. Oct 92, 40p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, San Francisco, CA. Region IX.

This presents the findings of a compliance evaluation inspection of the Silver Bell Mine in Pima County, Arizona, conducted on August 19, 1992. It is part of a series of inspections of uncontrolled discharges of mine drainage.

Keywords: *Acid mine drainage, *Storm water runoff, *Inspection, Water pollution monitoring, Water pollution control, Mine waters, Mine wastes, Tailings, Leaching, Site surveys, Requirements, Recommendations, Standards compliance, Arizona, Pima County(Arizona), Uncontrolled discharge, NPDES(National Pollutant Discharge Elimination System).

PB94-178662/REB PC **A03**/MF **A01**
Environmental Protection Agency, Denver, CO. Water Management Div.
Compliance Evaluation Inspection Report: Forney Industries, Fort Collins, Colorado. Final rept.
Science Applications International Corp., Denver, CO.
G. Polvi. Nov 90, 28p
Contract EPA-68-C8-0066
Portions of this document are not fully legible. Sponsored by Environmental Protection Agency, Denver, CO. Water Management Div.

This presents findings of a compliance evaluation inspection of Forney Industries in Fort Collins, Colorado, conducted on September 4, 1990. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Standards compliance, Runoff, Permits, Pretreatment, Trichloroethanes, Requirements, Recommendations, Site surveys, Colorado, Fort Collins(Colorado), Larimer County(Colorado), NPDES(National Pollutant Discharge Elimination System).

PB94-178670/REB PC **A04**/MF **A01**
Surface Water Monotoring: A Framework for Change. Final rept.
Environmental Protection Agency, Washington, DC. Office of Policy, Planning and Evaluation.
M. E. Blakeslee, P. J. Campanella, and D. A. Smalley.
Sep 87, 71p

The report presents the findings and recommendations of a study of EPA's surface water monitoring activities. The main objectives were to determine where EPA's surface water monitoring should be heading in the late 1980s, identify where specific adjustments to the current program are needed, and how those changes should be made.

Keywords: *Surface waters, *Water pollution monitoring, *Nonpoint sources, Chemical properties, Physical properties, Biological properties, Water analysis, Testing methods, Toxic substances, Hazardous materials, Water quality mangement, Information needs, Information retrieval, Clean Water Act, Recommendations.

PB94-178688/REB PC **A03**/MF **A01**
Environmental Protection Agency, San Francisco, CA. Region IX.
NPDES Compliance Monitoring Report: Oracle Ridge Mine, San Manuel, Arizona. Draft rept.
Science Applications International Corp., Los Altos, CA.
J. Stevens. 3 Nov 92, 47p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, San Francisco, CA. Region IX.

This presents the findings of a compliance evaluation inspection of the Oracle Ridge Copper Mine near San Manuel, Arizona, conducted on August 17, 1992. It is part of a series of inspections of uncontrolled discharges of mine drainage.

Keywords: *Acid mine drainage, *Storm water runoff, *Inspection, Water pollution monitoring, Water pollution control, Mine waters, Mine wastes, Tailings, Leaching, Site surveys, Requirements, Recommendations, Standards compliance, Arizona, San Manuel(Arizona), Pima County(Arizona), Oracle Ridge Mine, Uncontrolled discharge, NPDES(National Pollutant Discharge Elimination System).

PB94-178696/REB PC **A03**/MF **A01**
Environmental Protection Agency, Denver, CO. Water Management Div.
Compliance Evaluation Inspection Report: City of Grand Junction, Persigo WWTP, Grand Junction, Colorado. NPDES Permit No. CO-0040053. Final rept.
Science Applications International Corp., Denver, CO.
Sep 91, 35p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Water Management Div.

This presents the findings of a compliance evaluation inspection of the City of Grand Junction Persigo WWTF in Grand Junction, Colorado, conducted on August 7, 1991. It is part of a series of inspections of municipal POTW dischargers.

Keywords: *Waste water treatment, *Municipal wastes, *Inspection, Persigo Wash, Water treatment, Water pollution control, Sludge treatment, Permits, Outfall, Runoff, Chlorination, Requirements, Standards compliance, Recommendations, Site surveys, Colorado, Grand Junction(Colorado), Mesa County(Colorado), POTW(Publicly Owned Treatment Works), NPDES(National Pollutant Discharge Elimination System).

PB94-178704/REB PC **A02**/MF **A01**
Environmental Protection Agency, Denver, CO. Water Management Div.
Compliance Evaluation Inspection Report: Classic Plastics, Inc., Kelim, Colorado. Final rept.
Science Applications International Corp., Denver, CO.
G. Polvi. Oct 90, 8p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Water Management Div.

This presents the findings of a compliance evaluation inspection of Classic Plastics, Inc. in Kelim, Colorado, conducted on September 4, 1990. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Plastics industry, Standards compliance, Runoff, Septic tanks, Requirements, Recommendations, Site surveys, Colorado, Kelim(Colorado), Leach lines, NPDES(National Pollutant Discharge Elimination System).

PB94-178712/REB PC **A03**/MF **A01**
Environmental Protection Agency, Denver, CO. Water Management Div.
Compliance Evaluation Inspection Report: Leadville Sanitation District, Leadville, Colorado, Part A. NPDES Permit No. CO-0021164. Final rept.
Science Applications International Corp., Denver, CO.
29 May 92, 23p
Contract EPA-68-C8-0066
See also Part B, PB94-178720. Sponsored by Environmental Protection Agency, Denver, CO. Water Management Div.

This presents the findings of a compliance evaluation inspection of the Leadville Sanitation District WWTP in Leadville, Colorado, conducted on May 29, 1992. It is part of a series of inspections of municipal POTW dischargers.

Keywords: *Waste water treatment, *Municipal wastes, *Inspection, Water treatment, Water pollution control, Sludge treatment, Permits, Outfall, Runoff, Chlorination, Requirements, Standards compliance, Recommendations, Site surveys, Colorado, Leadville(Colorado), Lake County(Colorado), POTW(Publicly Owned Treatment Works), NPDES(National Pollutant Discharge Elimination System).

PB94-178720/REB PC **A03**/MF **A01**
Environmental Protection Agency, Denver, CO. Water Management Div.
Compliance Evaluation Inspection Report: Leadville Sanitation District, Leadville, Colorado. Part B. NPDES Permit No. CO0021164. Final rept.
Science Applications International Corp., Denver, CO.
Dec 92, 23p
Contract EPA-68-C8-0066
See also Part A, PB94-178712. Sponsored by Environmental Protection Agency, Denver, CO. Water Management Div.

This presents the findings of a compliance evaluation inspection of the Leadville Sanitation District WWTP in Leadville, Colorado, conducted on May 29, 1992. It is part of a series of inspections of municipal POTW dischargers.

Keywords: *Waste water treatment, *Municipal wastes, *Inspection, Water treatment, Water pollution control, Sludge treatment, Permits, Outfall, Runoff, Chlorination, Requirements, Standard compliance, Recommendations, Site surveys, Colorado, Leadville(Colorado), Lake County(Colorado), POTW(Publicly Owned Treatment Works), NPDES(National Pollutant Discharge Elimination System).

PB94-179009/REB PC **A07**/MF **A02**
Guidelines for MACT Determinations under Section 112(j). Final Report.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
May 94, 148p EPA/453/R-94/026
See also Proposal, PB93-183283.

This guidance document is designed to clarify the statutory and regulatory requirements for MACT determinations as required by Section 112(j) of the Clean Air Act as amended in 1990 (the Act). It sets forth procedures for determining emission limitations based on maximum achievable control technology for major sources who are required to apply for a new Title V permit, revise an existing permit, or apply for a Notice of MACT approval because the promulgation deadline for a MACT standard is missed by greater than 18 months for an applicable source category.

Keywords: *Air pollution control, *Air pollution standards, Permits, Requirements, Pollution regulations, Administrative procedures, Hazardous materials, Emission factors, Environmental impacts, Standards compliance, Law enforcement, Air pollution sources, *MACT(Maximum Achievable Control Technology), NESHAP(National Emissions Standards for Hazardous Air Pollutants), Clean Air Act Amendments of 1990.

PB94-179843/REB PC **A12**/MF **A03**
Environmental Protection Agency, Washington, DC. Office of Water.
Regulatory Impact Analysis for the National Primary Drinking Water Regulations: Disinfectants/Disinfection By-Products Rule. Appendix Volume 1: Disinfection By-Products Regulatory Analysis Model (DBP-RAM). Part 2: Critical Reviews and Refinements Made to Support REG-NEG.
Miller (Wade) Associates, Inc., Arlington, VA.
B. Rourke, and S. Regli. 25 May 94, 260p
Contract EPA-68-C3-0368
See also PB94-179868, PB94-179850, PB94-179892 and PB94-179900. Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

Contents:
Critical Reviews and Refinements Made to Support REG-NEG;

Presentations to U.S. EPA Science Advisory Board and Critical Reviews;
Presentations to REG-NEG Committee and Critical Reviews;
and Refinements Made to Support REG-NEG Analyses.

Keywords: *Disinfection, *Water quality standards, *Byproducts, Disinfectants, Water treatment, Microorganism control(Water), Potable water, Requirements, Standards compliance, Maximum permissible level, Water distribution, Water systems, Water utilities, Economic impact, Reviewing, *Regulatory impact analysis, National Primary Drinking Water Regulations, Safe Drinking Water Act.

PB94-179850/REB PC **A19/MF A04**
Environmental Protection Agency, Washington, DC. Office of Water.
Regulatory Impact Analysis for the National Primary Drinking Water Regulations: Disinfectants/Disinfection By-Products Rule. Appendix Volume 1: Disinfection By-Products Regulatory Analysis Model (DBP-RAM). Part 1: Model Development.
Miller (Wade) Associates, Inc., Arlington, VA.
B. Rourke, and S. Regli. 25 May 94, 438p
Contract EPA-68-C3-0368
See also PB94-179868, PB94-179843, PB94-179892, and PB94-179900. Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

In developing regulations for disinfection by-products (DBPs), USEPA needs to ensure that drinking water utilities can effectively provide treatment that controls concentrations of both DBPs and microbiological organisms. USEPA's objective in establishing DBP limits is to minimize the total costs to society. Total costs are calculated as the sum of treatment costs, monitoring costs and health damages remaining after treatment. In order to develop the total social cost for a single regulation, USEPA needs to estimate: the extent to which utilities need to change from present treatment practices to other treatment practices in order to meet the regulation. The objective of the analysis described in this paper is to describe the methods used to estimate the above items.

Keywords: *Disinfection, *Water quality standards, *Byproducts, Disinfectants, Water treatment, Microorganism control(Water), Potable water, Requirements, Standards compliance, Maximum permissible level, Water distribution, Water systems, Water utilities, Economic impact, *Regulatory impact analysis, DBPRAM(Disinfect By-Products Regulatory Analysis Model), National Primary Drinking Water Regulations, Safe Drinking Water Act.

PB94-179868/REB PC **A07/MF A02**
Environmental Protection Agency, Washington, DC. Office of Water.
Regulatory Impact Analysis for the National Primary Drinking Water Regulations: Disinfectants/Disinfection By-Products Rule.
Miller (Wade) Associates, Inc., Arlington, VA.
B. Rourke, and S. Regli. 25 May 94, 126p
Contract EPA-68-C3-0368
See also PB94-179850, PB94-179843, PB94-179892, and PB94-179900. Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

This Regulatory Impact Analysis analyzes net benefits and considers the regulatory alternatives in light of a criterion of maximizing net benefits.

Keywords: *Disinfection, *Water quality standards, *Byproducts, Disinfectants, Water treatment, Microorganism control(Water), Potable water, Requirements, Standards compliance, Maximum permissible level, Water distribution, Water systems, Water utilities, Economic impact, *Regulatory impact analysis, National Primary Drinking Water Regulations, Safe Drinking Water Act.

PB94-179876/REB PC **A08/MF A02**
Drinking Water Criteria Document for Chloramines. Final draft rept.
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Mar 94, 152p ECAO-CIN-D002

This document provides the health effects basis to be considered in establishing the Maximum Contaminant Level Goals (MCLG). To achieve this objective, data on pharmacokinetics, human exposure, acute and chronic toxicity to animals and humans, epidemiology and mechanisms of toxicity are evaluated. Specific emphasis is placed on literature data providing dose-response information. While the literature search and evaluation performed in support of this document has been comprehensive, only the reports considered most pertinent in the derivation of the MCLG are cited in the document. The comprehensive literature data base in support of this document includes information published up to 1986; however, more recent data have been added during the review process, and final revisions updating this document were made.

Keywords: *Water quality standards, *Drinking water, *Water treatment, *Chloramines, Potable water, Byproducts, Risk assessment, Biological effects, Dose-response relationships, Humans, Laboratory animals, Chlorination, Toxicity, Exposure, Ingestion(Biology), Epidemiology, Maximum contaminant level goals, Pharmacokinetics, Safe Drinking Water Act.

PB94-179884/REB PC **A08/MF A02**
Drinking Water Criteria Document for Chlorine, Hypochlorous Acid and Hypochlorite Ion. Draft rept.
Environmental Protection Agency, Washington, DC. Health and Ecological Criteria Div.
Jan 94, 165p

This document provides the health effects basis to be considered in establishing the Maximum Contaminant Level Goals (MCLG). To achieve this objective, data on pharmacokinetics, human exposure, acute and chronic toxicity to animals and humans, epidemiology and mechanisms of toxicity are evaluated. Specific emphasis is placed on literature data providing dose-response information. While the literature search and evaluation performed in support of this document has been comprehensive, only the reports considered most pertinent in the derivation of the MCLG are cited in the document. The comprehensive literature data base in support of this document includes information published up to 1989; however, more recent data may have been added during the review process.

Keywords: *Water quality standards, *Drinking water, *Water treatment, *Hypochlorous acid, *Chlorine, *Hypochlorites, Ions, Potable water, Byproducts, Risk assessment, Biological effects, Dose-response relationships, Humans, Laboratory animals, Chlorination, Toxicity, Exposure, Ingestion(Biology), Epidemiology, Maximum contaminant level goals, Pharmacokinetics, Safe Drinking Water Act.

PB94-179892/REB PC **A19/MF A04**
Environmental Protection Agency, Washington, DC. Office of Water.
Regulatory Impact Analysis for the National Primary Drinking Water Regulations: Disinfectants/Disinfection By-Products Rule. Appendix Volume 2: REG-NEG Technologies Working Group Working Papers/Analysis of Regulatory Alternatives.
Miller (Wade) Associates, Inc., Arlington, VA.
B. Rourke, and S. Regli. 25 May 94, 450p
Contract EPA-68-C3-0368
See also PB94-179868, PB94-179850, PB94-179843 and PB94-179900. Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

This is the REG-NEG Technologies Working Group working papers/analysis of regulatory alternatives.

Keywords: *Disinfection, *Water quality standards, *Byproducts, Disinfectants, Water treatment, Microorganism control(Water), Potable water, Requirements, Standards compliance, Maximum permissible level, Water distribution, Water systems, Water utilities, Economic impact, *Regulatory impact analysis, National Primary Drinking Water Regulations, Safe Drinking Water Act.

PB94-179900/REB PC **A13/MF A03**
Environmental Protection Agency, Washington, DC. Office of Water.
Regulatory Impact Analysis for the National Primary Drinking Water Regulations; Disinfectants/Disinfection By-Products Rule. Appendix Volume 3: REG-NEG Technologies Working Group Working Papers/Assessment of Technology Performance and Cost.
Miller (Wade) Associates, Inc., Arlington, VA.
B. Rourke, and S. Regli. 25 May 94, 284p
Contract EPA-68-C3-0368
See also PB94-179868, PB94-179850, PB94-179843 and PB94-179892. Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

This Appendix deals with the REG-NEG Technologies Working Group working papers/assessment of technology performance and cost.

Keywords: *Disinfection, *Water quality standards, *Byproducts, Alternatives, Cost analysis, Disinfectants, Water treatment, Microorganism control(Water), Potable water, Requirements, Standards compliance, Maximum permissible level, Water distribution, Water systems, Water utilities, Economic impact, *Regulatory impact analysis, National Primary Drinking Water Regulations, Safe Drinking Act.

PB94-179918/REB PC **A12/MF A03**
Environmental Protection Agency, Washington, DC. Office of Water.
Final Draft for the Drinking Water Criteria Document on Chlorinated Acids/Aldehydes/Ketones/Alcohols.
Clement International Corp., Fairfax, VA.
31 Mar 94, 268p ECAO-CIN-D004
Contract EPA-68-C2-0139
Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

This document provides the health effects basis to support establishing the Maximum Contaminant Level Goals (MCLG) for various chlorinated acids, aldehydes, ketones and alcohols found in chlorinated drinking water. To establish these values, data on pharmacokinetics, human exposure, acute and chronic toxicity to animals and humans, epidemiology and mechanisms of toxicity were evaluated. Specific emphasis is placed on literature data providing dose-response information. While the literature search and evaluation performed in support of this document was comprehensive, only the reports considered most pertinent in the derivation of the MCLG are cited in the document. The comprehensive literature search in support of this document includes information published up to 1991; however, more recent information may have been added during the review process.

Keywords: *Water quality standards, *Drinking water, *Water treatment, *Aldehydes, *Ketones, *Alcohols, Potable water, Byproducts, Risk assessment, Biological effects, Dose-response relationships, Humans, Laboratory animals, Chlorination, Toxicity, Exposure, Ingestion(Biology), Epidemiology, *Chlorinated acids, Maximum contaminant level goals, Pharmacokinetics, Safe Drinking Water Act.

PB94-179926/REB PC **A08/MF A02**
Environmental Protection Agency, Washington, DC. Office of Water.
Final Draft for the Drinking Water Criteria Document on Chlorine Dioxide, Chlorite and Chlorate.
Clement International Corp., Fairfax, VA.
31 Mar 94, 159p
Contract EPA-68-C2-0139
Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

This document provides the health effects basis to support establishing Maximum Contaminant Level Goals (MCLG) values for chlorine dioxide, chlorite and chlorate. To set these values, data on pharmacokinetics, human exposure, acute and chronic toxicity to animals and humans, epidemiology and mechanisms of toxicity were evaluated. Specific emphasis is placed on literature data providing dose-response information. While the literature search and evaluation performed in support of this document were comprehensive, only the reports considered most pertinent in the derivation of the Maximum Contaminant Level Goals are cited in the document. The comprehensive literature search in support of this document includes information published up to 1990.

Keywords: *Water quality standards, *Drinking water, *Water treatment, *Chlorine dioxide, *Chlorates, *Chlorites, Potable water, Byproducts, Risk assessment, Biological effects, Dose-response relationships, Humans, Laboratory animals, Chlorination, Toxicity, Exposure, Ingestion(Biology), Epidemiology, Maximum contaminant level goals, Pharmacokinetics, Safe Drinking Water Act.

PB94-179934/REB PC **A04**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Water.
Final Draft for the Drinking Water Criteria Document on Bromate.
Clement International Corp., Fairfax, VA.
30 Sep 93, 58p
Contract EPA-68-C2-0139
Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

The document provides the health effects basis to support establishing the Maximum Contaminant Level Goals (MCLG) for various chlorinated acids, aldehydes, ketones and alcohols found in chlorinated drinking water. To establish these values, data on pharmacokinetics, human exposure, acute and chronic toxicity to animals and humans, epidemiology and mechanisms of toxicity were evaluated. Specific emphasis is placed on literature data providing dose-response information. The comprehensive literature search in support of the document includes information published up to 1991; however, more recent information may have been added during the review process.

Keywords: *Water quality standards, *Drinking water, *Water treatment, *Bromates, Potable water, Byproducts, Risk assessment, Biological effects, Dose-response relationships, Humans, Laboratory animals, Chlorination, Toxicity, Exposure, Ingestion(Biology), Epidemiology, Maximum contaminant level goals, Pharmacokinetics, Safe Drinking Water Act.

PB94-179942/REB PC **A14**/MF **A03**
Environmental Protection Agency, Washington, DC. Office of Water.
Final Draft for the Drinking Water Criteria Document on Trihalomethanes.
Clement International Corp., Fairfax, VA.
8 Apr 94, 309p
Contract EPA-68-C2-0139
Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

The document provides the health effects basis to be considered in establishing the Maximum Contaminant Level Goals (MCLGs) for four trihalomethanes found in chlorinated drinking water. To achieve this objective, data on pharmacokinetics, human exposure, acute and chronic toxicity to animals and humans, epidemiology and mechanisms of toxicity were evaluated. Specific emphasis is placed on literature data providing dose-response information. While the literature search and evaluation performed in support of the document was comprehensive, only the reports considered most pertinent in the derivation of the MCLGs are cited in the document. The comprehensive literature search in support of the document includes information published up to 1989, however, more recent information may have been added during the review process.

Keywords: *Water quality standards, *Drinking water, *Water treatment, Halomethanes, Halogen organic compounds, Potable water, Byproducts, Risk assessment, Biological effects, Dose-response relationships, Humans, Laboratory animals, Chlorination, Toxicity, Exposure, Ingestion(Biology), Epidemiology, *Trihalomethanes, Maximum contaminant level goals, Pharmacokinetics, Safe Drinking Water Act.

PB94-180643/REB PC **A03**/MF **A01**
Determining the Relationship between Water Quality and Ulcerative Mycosis in Atlantic Menhaden. Final rept.
North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.
E. J. Noga, S. E. Johnson, D. W. Dickey, D. Daniels, and J. M. Burkholder. Mar 93, 45p APES-92-15
Prepared in cooperation with East Carolina Univ., Greenville, NC. Inst. for Coastal and Marine Resources.

The objectives of the study were to investigate the possible causes of ulcerative mycosis (UM) in the Albemarle-Pamlico Estuary. Ulcerative mycosis is the commonest disease affecting the finfish populations of the Albemarle-Pamlico Estuary.

Keywords: *Estuaries, *Water quality, *Fish diseases, Pathogenic fungi, Water pollution effects(Animals), Toxicity, Salinity, Dissolved gases, Oxygen, pH, Temperature, Seasonal variations, Atlantic menhaden, UM(Ulcerative mycosis), Albemarle-Pamlico estuary, Finfishes.

PB94-180734/REB PC **A06**/MF **A02**
Pilot Monitoring Project for 14 Pesticides in Maryland Surface Waters. Technical rept.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
R. B. Kroll, and D. L. Murphy. Dec 93, 118p CBP/TRS-106/94
Also pub. as Maryland Dept. of the Environment, Baltimore. Water Management Div. rept. no. MDE/CBWMA/WMA/TR-93-020. Prepared in cooperation with Maryland Dept. of the Environment, Baltimore. Water Management Div.

A pilot pesticide monitoring project was conducted by the Maryland Department of the Environment (MDE) during calendar year 1992. Surface waters from three regions of the State were monitored for the presence of 14 pesticides. The list of analytes was compiled from the results of a risk screening effort by MDE, a collaborative project with the U.S. Fish and Wildlife Service (USFWS), and recommendations from the Chesapeake Bay Program (CBP) Toxics Sub-Committee, Alachlor, adrin, atrazine, carbofuran, chlordane, chlorpyrifos, cyanazine, dieldrin, diflubenzuron, fenvalerate, metolachlor, permethrin, simazine, and toxaphene were the 14 pesticides on the analyte list. Eleven sites were selected as sampling stations. All except one (the control) were judged to be probable recipients of nonpoint source agricultural or urban runoff.

Keywords: *Toxicity, *Pesticides, *Surface waters, *Water pollution sampling, *Runoff, Sites, Nonpoint source, Urban areas, Risk assessment, Chlorodan, Aldrin, Dieldrin, Chesapeake Bay Program, Alachlor.

PB94-180742/REB PC **A03**/MF **A01**
Chesapeake Bay Black Drum Fishery Management Plan. Agreement Commitment Report, 1993.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Sep 93, 41p
See also PB94-177557.

The goal of the Chesapeake Bay Black Drum Management Plan is to enhance and perpetuate black drum stocks in the Chesapeake Bay and its tributaries, and throughout their Atlantic coast range, so as to generate optimum long-term ecological, social and economic benefits from their commercial and recreational harvest and utilization over time. To meet this goal, a number of objectives must be met. They include promoting the development of guidelines by the Atlantic States Marine Fisheries Commission (ASMFC) and the Mid-Atlantic Fishery Management Council (MAFMC) for coastwide management of the black drum fishery, providing for fair allocation of the resource, promoting efficient harvesting practices, promoting biological and economic research and pursuing standards of environmental quality and habitat protection. These objectives are incorporated into the problems and management strategies discussed.

Keywords: *Fish management, *Marine fisheries, *Chesapeake Bay, Environment management, State implementation plans, Aquatic ecosystems, Regulations, Commercial fishing, Fish harvest, Habitats, Mortality, Recreation, Socioeconomic factors, Fish stocking, *Black drum.

PB94-180759/REB PC **A05**/MF **A02**
Nutrient Management. Supplement to the Journal of Soil and Water Conservation Volume 49, Number 2.
Environmental Protection Agency, Washington, DC. Office of Wetlands, Oceans and Watersheds.
c1994, 98p

Partial Contents:
- General Introduction;
- Nutrient management, an integrated component for water quality protection;
- The Soil Conservation Service experience;
- Understanding the Basics;
- Understanding the nutrient cycling process;
- Understanding the nutrient management process;
- Minimizing surface water eutrophication from agriculture by phosphorous management;
- Managing Animal Wastes;
- Methane production from animal wastes;
- Coastal Zone Reauthorization Amendment of 1990 (CZARA);
- Nutrient management measure to be implemented in the coastal zone;
- State/Regional Experiences;
- A local agency's approach to solving the difficult problem of nitrate in groundwater (Nebraska);
- Nutrient management legislation in Pennsylvania.

Keywords: *Nutrients, *Agriculture, *Water quality management, *Surface water runoff, Ground water, Soil properties, Soil conservation, Pollution control, USEPA, Phosphorus, Eutrophication, Mathematical models, Methane, Production, Animal wastes, Best management practices, Inorganic nitrates, California, States(United States), Microorganisms control(Water), Reprints, CZARA(Coastal Zone Act Reauthorization Amendment of 1990), Crop rotation.

PB94-180767/REB PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Water.
Cost-Effectiveness Analysis of Proposed Effluent Limitations Guidelines and Standards for the Pesticide Formulating, Packaging and Repackaging Industry.
Abt Associates, Inc., Cambridge, MA.
L. G. Tudor. Mar 94, 50p EPA/821/R-94/004
Contracts EPA-68-C0-0080, EPA-68-C3-0302
Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

The analysis is submitted in support of the proposed effluent limitations guidelines and standards for the Pesticide Formulating, Packaging, and Repackaging (PFPR) Industry. Section 2 of the report defines cost-effectiveness, discusses the cost-effectiveness methodology, and describes the relevant regulatory options. Section 3 presents the findings of the analysis covering only the original 272 Pesticide Active Ingredients (PAIs). Section 4 provides the results of the analysis of the option including non-272 PAIs. In Section 5, the cost-effectiveness values are compared to cost-effectiveness values for other promulgated rules. Four appendices are also included. Appendix A lists the original 272 pesticides active ingredients on which this analysis is based. Appendix B lists the toxic weighting factors for these 272 PAIs. Appendix C describes the cost-effectiveness results for direct discharging facilities to comply with the existing Best Practicable Control Technology Currently Available (BPT) regulation. Finally, Appendix D provides a sensitivity analysis of POTW removal efficiencies for PAIs.

Keywords: *Pesticides, *Chemical industry, *Water pollution economics, *Economic impact, Water pollution standards, Water pollution control, Cost effectiveness, Best cost analysis, Market analysis, Alternatives, Formulation, Materials handling, Packaging, Chemical effluents, Requirements, Standards compliance, Pollution regulations, Repackaging.

PB94-181047/REB PC **A99**/MF **A06**
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Proceedings of the National United States Environmental Protection Agency Conference (8th) on Household Hazardous Waste Management. Held in Burlington, Vermont on November 6-10, 1993.
Conference proceedings.
Waste Watch Center, Andover, MA.
Jan 94, 679p* EPA/530/R-94/022
Grant EPA-9019090-01
See also PB93-170116. Sponsored by Environmental Protection Agency, Washington, DC. Office of Solid Waste. and Governmental Refuse Collection and Disposal Association, Silver Spring, MD.

The report contains opening plenary session and workshop materials from the conference. Workshop topics include: 'How-To's' for collection day program beginners, paint reuse and recycling programs, education, heavy metals, funding issues for permanent programs, containers and special wastes, developing programs for conditionally exempt small quantity generators, clean and green building and repair, toxicity reduction and changing consumer attitudes, and waste water pollution prevention household hazardous wastes (HHW) programs. Appendices include final agenda, final list of speakers, speakers' biographical sketches, list of attendees, poster session participants, national listing of HHW programs, HHW management state contacts, permanent HHW manage-

ment program managers, collection program contractors, and waste watch center publications order form.

Keywords: *Household wastes, *Hazardous materials, *Waste management, *Meetings, Waste recycling, Waste disposal, Paints, Batteries, Heavy metals, Cleaning agents, Electronic equipment, Toxicity, Consumers, Public information, Education, Alternatives, Planning, Economic analysis, Interagency coordination, Waste minimization, Source reduction.

PB94-181310/REB PC A03/MF A01
Directory of OAQPS Information Services, May 1994.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
May 94, 33p EPA/452/B-94/010
See also PB93-196624.

The Office of Air Quality Planning and Standards (OAQPS) provides many types of information services to EPA Headquarters and Regional Offices, State and local air pollution control agencies, consultants, industry, and the general public. The goal of the directory is to provide a brief listing of these services so that users can more easily determine what is available and how to obtain it. Information is grouped into four major areas: pollutant/program services technical support services, administrative support services, and compliance services. Each major area is further divided into sub-categories. Within each sub-category, line items describing information services are categorized by the type of delivery mechanism used. These include electronic bulletin boards, clearinghouses, reports and other documents, newsletters, support centers, workshops, and direct training such as classroom and self-instructional courses.

Keywords: *Directories, *Air pollution control agencies, *Information services, US EPA, Information dissemination, Information retrieval, Pollution regulations, Administrative procedures, Permits, Compliance, Public information, State government, Local government, Technology transfer, Office of Air Quality Planning and Standards, Bulletin boards.

PB94-181377/REB PC A02/MF A01
National Water Quality Inventory 1992 Report to Congress. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Water.
Apr 94, 9p EPA/841/F-94/002
See also report for 1990, PB92-227800.

This 1992 Report is based on water quality assessments submitted by 57 states, territories, interstate jurisdictions, and an American Indian Tribe (hereafter collectively referred to as states). These State assessments describe water quality conditions during 1990-1991. Rivers, lakes, estuaries, wetlands, coastal waters, Great Lakes, and ground water are all covered in this Report. This Report also contains information on public health and aquatic life concerns, water quality monitoring, and state and federal water pollution control programs.

Keywords: *United States, *Water quality management, *Water pollution monitoring, Surface waters, Ground water, Wetlands, Rivers, Lakes, Estuaries, Reservoirs, Water utilization, Water pollution sources, Aquatic biology, Public health, National Water Quality Inventory.

PB94-181393/REB PC A11/MF A03
SO2 Guideline Document. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
A. M. Smith. Feb 94, 241p EPA/452/R-94/008

The SO2 (sulfur dioxide) guideline document is a compilation of currently available policy and guidance for SO2 programs. It is intended only to provide a guide to SO2 policy and guidance in effect at the time of the document's preparation and does not present any new policy or guidance. Each chapter summarizes relevant policy and guidance and provides detailed references to guide the user to more complete sources found in the appendix and elsewhere. References include statutory and regulatory sources (Clean Air Act and Code of Federal Regulations), Federal Register notices, and U.S. Environmental Protection Agency (EPA) guidance documents and memoranda, and questions and answers. The guideline covers topic such as air quality status, air quality monitoring and modeling, and control strategies.

Keywords: *Sulfur dioxide, *Air pollution control, *Pollution regulations, Air pollution monitoring, Air pollution sources, Ambient air quality, Stacks, Standards compliance, Law enforcement, Government policies, Guidelines, Manuals, Air quality modeling, New Source Performance Standards, State implementation plans.

PB94-181401/REB PC A22/MF A04
Economic Impact Analysis of Proposed Effluent Limitations Guidelines and Standards for the Pesticide Formulating, Packaging, and Repackaging Industry.
Environmental Protection Agency, Washington, DC. Office of Water.
L. G. Tudor. Mar 94, 520p EPA/821/R-94/003
See also PB94-180767.

The Economic Impact Analysis (EIA) assesses the economic impact of proposed guidelines and standards under the Clean Water Act for the Pesticide Formulating, Packaging, and Repackaging (PFPR) subcategories of the Pesticide Chemicals Point Source Category (40 CFR 355). For the regulation, EPA divided the existing PFPR subcategory into two subcategories: (1) Subcategory C: Pesticide Chemicals formulating, Packaging, and Repackaging; and (2) Subcategory E: Repackaging of Agricultural Chemicals Performed at Refilling Establishments. The regulation includes limitations for Best Practicable Control Technology (BPT), Best Conventional Pollutant Control Technology (BCT), Best Available Technoogy Economically Achievable (BAT), New Source Performance Standards (NSPS) and Pretreatment Standards for Existing and New Sources (PSES and PSNS). Because BCT and BAT requirements match the established BPT requirements, no additional costs are expected for compliance with the BCT and BAT limitations. Accordingly, this EIA focuses on analyzing alternative PSES options.

Keywords: *Pesticides, *Chemical industry, *Water pollution economics, *Economic impact, Water pollution standards, Water pollution control, Cost effectiveness, Best cost analysis, Market analysis, Alternatives, Formulations, Materials handling, Packaging, Chemical effluents, Requirements, Standards compliance, Pollution regulations, Repackaging.

PB94-181526/REB PC A03/MF A01
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Assessment of Salinity Effects on the Toxicity of Atrazine to Chesapeake Bay Species: Data Needs for Development of Estuarine Aquatic Life Criteria. Final rept.
Maryland Univ., Queenstown. Wye Research and Education Center.
L. W. Hall, M. C. Ziegenfuss, and R. D. Anderson. Mar 93, 35p CBP/TRS-109/94
See also PB94-114733. Sponsored by Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.

The study was designed to determine the influence of a range of salinities (5, 15 and 25 ppt) on the acute toxicity of atrazine to the copepod, Eurytemora affinis and the sheepshead minnow larvae, Cyprinodon variegatus. An additional objective of the study was to provide acute atrazine toxicity data for E. affinis to fill a data requirement for development of an estuarine water quality criterion. The conclusion from the study is that salinity influences the toxicity of atrazine to two Chesapeake Bay species but the influence is exerted in opposite ways (increased or decreased toxicity) depending on the test species.

Keywords: *Toxicity, *Salinity, *Pesticides, *Water pollution effects(Animals), Chesapeake Bay, Aquatic animals, Copepods, Minnows, Water quality data, Ecosystems, Exposure, Bioassay, Estuaries, Statistical analysis, *Atrazine, Eurytemora affinis, Cyprinodon veriegatus, Sheepshead minnow.

PB94-181534/REB PC A06/MF A02
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Updated Review of Estuarine Aquatic Toxicity Data for the Development of Aquatic Life Criteria for Atrazine in Chesapeake Bay. Phase 2 Report.
Maryland Univ., Queenstown. Wye Research and Education Center.
L. W. Hall, and R. D. Anderson. Mar 94, 118p CBP/TRS-108/94
See also PB-255 439 and PB84-149541. Sponsored by Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.

The report is a summary of Phase I and II of a study designed to provide necessary data and recommendations for development of estuarine acute and chronic atrazine criterion for the Chesapeake Bay. An updated summary of existing toxicity data showed that acceptable acute toxicity data were available for eight animal species in eight different families. These data will provide the necessary information required by the U.S. Environmental Protection Agency for the development of an acute estuarine criterion for atrazine. Data are needed from four different families (including one plant) for a chronic estuarine criterion. Available data can be used to fill the requirements for three of the families needed; however, one additional chronic test will be required.

Keywords: *Toxicity, *Pesticides, *Water pollution effects(Animals), Chesapeake Bay, Aquatic animals, Water quality data, Chronic exposure, Acute exposure, Technology assessment, Ecosystems, Estuaries, Statistical analysis, Copepods, Bioaccumulation, Water pollution effects(Plants), Marine biology, *Atrazine, Eurytemora affinis.

PB94-181542/REB PC A03/MF A01
Clean Water Act Section 403 Report to Congress: Phase 2. Point Source Discharges Inside the Baseline.
Environmental Protection Agency, Washington, DC. Office of Wetlands, Oceans and Watersheds.
Apr 94, 46p EPA/842/R-94/001
See also PB91-127415 and PB93-207488.

In response to a request from the U.S. House of Representatives, Committee on Merchant Marine and Fisheries, the U.S. Environmental Protection Agency (EPA) has conducted an inventory and assessment of effluent discharges to estuarine waters. The purpose of this effort is to provide Congress with the information necessary to properly consider the consequences of legislation that would extend the requirements of section 403 of the Clean Water Act (CWA) to include effluent discharges to estuarine waters. The report responds to Congress's request for information and presents the findings of EPA's assessment.

Keywords: *Point sources, *Ocean waste disposal, *Water pollution control, Clean Water Act, Pollution regulations, Water pollution standards, Discharge(Water), Estuaries, Baseline studies, Environmental impacts, Requirements, Alternatives, Standards compliance, Environmental protection, Section 403, NPDES(National Pollutant Discharge Elimination System).

PB94-181591/REB PC A15/MF A03
Environmental Protection Agency, Washington, DC. Office of Wetlands, Oceans and Watersheds.
CWA Section 403: Procedural and Monitoring Guidance.
Tetra Tech, Inc., Arlington, VA.
Mar 94, 343p EPA/842/B-94/003
Contract EPA-68-C7-0008
This documents contains a section of the Federal Register, Vol. 45, No. 194, Friday, October 3, 1980. Sponsored by Environmental Protection Agency, Washington, DC. Office of Wetlands, Oceans and Watersheds.

The purpose of the document is to provide the Regions and NPDES-authorized States with a framework for the decision-making process to be followed in making a section 403 determination and to provide them with guidance for identifying the type and level of monitoring that should be required as part of a permit issued under the no irreparable harm provisions of section 403. Chapter 2 of the document presents an explanation of, and procedural guidance for, the overall process to be followed when issuing an NPDES permit in compliance with section 403 of the Clean Water Act. Chapter 3 discusses options for monitoring under the basis of no irreparable harm. Chapter 4 pre-

serts a summary of monitoring methods with potential applications to 403 discharges.

Keywords: *Water pollution monitoring, *Ocean waste disposal, *Aquatic ecology, Permits, Water pollution control, Marine biology, Biological accumulation, Environmental impacts, Environmental protection, Estuaries, Benthos, Water chemistry, Clean Water Act, Water pollution standards, Pollution regulations, Discharge(Water), Section 403, NPDES(National Pollutant Discharge Elimination System).

PB94-181609/REB PC **A99**/MF **E09**
WATERSHED '93: A National Conference on Watershed Management. Held in Alexandria, Virginia on March 21-24, 1993.
Environmental Protection Agency, Washington, DC. Office of Wetlands, Oceans and Watersheds.
Mar 93, 818p* EPA/840/R-94/002
Also available from Supt. of Docs. See also PB-252 106.

Partial Contents:
- Letter from the Vice President of the United States The Honorable Al Gore;
- Watersheds:
- Integrating Human Needs with Ecosystem Management;
- Addressing Multiple Interests;
- Diversity of Approaches in Watershed Management;
- Visions for the Future:
- A National Satellite Videoconference;
- Biodiversity, Rainforests, and BioParks;
- Historical Perspectives;
- Legislative Issues;
- Public Law 83-566 and Water Quality;
- Catalysts for Watershed Management;
- New Federal Directors;
- Financing Watershed Management;
- Identifying Priority Areas;
- Landscape Ecology;
- Forming Partnerships;
- Planning Approaches;
- Establishing Goals;
- Economic Modelling and Valuation;
- Watershed-Scale Total Maximum Daily Loads;
- Information Management and Geographical Information Systems;
- State Strategies;
- Urban Watersheds.

Keywords: *Watersheds, *Water quality management, *United States, *Meetings, Best management practices, Aquatic ecosystems, Case studies, Chesapeake Bay, Streams, Species diversity, Legislation, National government, Government agencies, US EPA, USDA, US ACE, Financing, Nonpoint sources, Economic factors, States(United States), Vidioconference, Rainforests, Organic loading.

PB94-181625/REB PC **A07**/MF **A02**
Environmental Protection Agency, Washington, DC.
Comprehensive Environmental Management Plan for the Currituck Sound Drainage Basin: Background Investigations. Final rept.
North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.
R. R. Rideout. Dec 90, 140p APES-90-19
Prepared in cooperation with North Carolina State Univ. at Raleigh. Dept. of Forestry. Sponsored by Environmental Protection Agency, Washington, DC.

The Currituck Sound drainage basin experienced rapid population growth and development during the past two decades. As a result of the changes that have occurred and are continuing to occur in the watershed, natural resource managers face new management issues. The objectives of this study were to (1) prepare an up-to-date, computer-accessible bibliography on Currituck Sound and Back Bay, Virginia; (2) identify perceived management issues in the study area; and (3) analyze an array of responsive, prospective management alternatives. No attempt was made to select a preferred alternative for future management of the Currituck Sound drainage basin as this decision was outside the scope of the current project. It is intended, however, that this work will provide insight to government officials and resource managers charged with making such decisions for the Currituck Sound-Back Bay complex and the larger Albemarle-Pamlico Estuarine Study Area.

Keywords: *Natural resource management, *Currituck sound, *Back Bay, *Water pollution abatement, Estuaries, Population growth, North Carolina, Virginia, Maintenance, Agreements, Local government, National government, Requirements, Statutes, Sea grant program, Interstate compact, Institutions, Federal-interstate compact.

PB94-181708/REB PC **A23**/MF **A04**
Development Document for Best Available Technology, Pretreatment Technology, and New Source Performance Technology for the Pesticide Formulating, Packaging, and Repackaging Industry. Proposed.
Environmental Protection Agency, Washington, DC. Office of Water.
S. H. Zuskin. 31 Mar 94, 538p EPA/821/R-94/002
See also PB94-181401.

Table of contents:
- Legal authority and background;
- Summary;
- Industry description;
- Industry subcategorization;
- Water use and waste water characteristics;
- Pollution parameters selected for regulation;
- Technology selection and methods to achieve the effluent limitations;
- Engineering costs;
- Best practical control technology;
- Best conventional pollutant control technology;
- Best available technology economically achievable;
- Pretreatment standards for existing sources;
- New source performance standards and Pretreatment standards for new sources;
- Regulatory implementation;
- Water quality analysis;
- Non-water quality environmental impacts; and Appendices.

Keywords: *Pesticides, *Chemical industry, *Alternatives, Water pollution standards, Water pollution control, Pretreatment, Water treatment, Chemical effluents, Waste water, Formulation, Materials handling, Packaging, Water use, Environmental impacts, Requirements, Standards compliance, Pollution regulations, Chemical plants, Clean Water Act, *Best available technology, Repackaging, New Source Performance Technology, Pollution Prevention Act.

PB94-181716/REB PC **A07**/MF **A02**
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
Innovative Site Remediation Technology: Thermal Desorption. Volume 6.
Consortium for American Academy of Environmental Engineers, Annapolis, MD. WASTECH
W. C. Anderson. cNov 93, 146p EPA/542/B-93/011
See also PB92-173210, PB92-221647 and PB92-224294. Library of Congress catalog card no. 93-20786. Sponsored by Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.

The monograph on thermal desorption is one of a series of eight on innovative site and waste remediation technologies that are the culmination of a multiorganization effort involving more than 100 experts over a two-year period. The thermal desorption processes addressed in this monograph use heat, either direct or indirect, ex situ, as the principal means to physically separate and transfer contaminants from soils, sediments, sludges, filter cakes, or other media. Thermal desorption is part of a treatment train; some pre- and postprocessing is necessary.

Keywords: *Superfund, *Technology innovation, *Waste management, *Hazardous materials, Remedial action, Waste treatment, Land pollution control, Case studies, Performance evaluation, Soil contamination, Sludge, Heat treatment, Innovative treatment technologies, Ex-situ remediation, Volatile organic compounds, Thermal desorption, Rotary desorbers, Heated conveyers.

PB94-181807/REB PC **A22**/MF **A04**
National Water Quality Inventory: 1992 Report to Congress.
Environmental Protection Agency, Washington, DC. Office of Wetlands, Oceans and Watersheds.
Mar 94, 506p EPA/841/R-94/001
See also PB92-227800.

Contents:
- Executive Summary;
- Measuring Water Quality;
- Sources of Water Pollution;
- Rivers and Streams;
- Lakes, Ponds, and Reservoirs;
- Estuaries;
- Ocean Coastal Waters;
- Wetlands;
- Ground Water;
- Water Quality Assessments;
- Public Health and Aquatic Life Concerns;
- Individual State Summaries;
- Costs and Benefits of Water Pollution Control.

Keywords: *Inventories, *Water quality, *United States government, Rivers, Lakes, Estuaries, Surface waters, Streams, Reservoirs, Acidity, Ground water, Water pollution control, Standards, Benefit cost analysis, States(United States), Tables(Data).

PB94-181864/REB PC **A10**/MF **A03**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Alternative Control Techniques Document: Surface Coating Operations at Shipbuilding and Ship Repair Facilities. Final rept.
Midwest Research Inst., Cary, NC.
Apr 94, 218p EPA/453/R-94/032
Contract EPA-68-D1-1115
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The report provides alternative control techniques (ACT) for State and local agencies to consider for incorporating in rules to limit emission of volatile organic compounds (VOC's) and particulate matter including PM-10 (that which measures 10 microns or less) that otherwise would result from surface coating operations at shipbuilding and ship repair facilities. The document contains information on emissions, controls, control options, and costs that State and local air pollution authorities can use in developing rules.

Keywords: *Air pollution control, *Alternatives, *Coating processes, *Shipyards, Paints, Solvents, Surface coating, Abrasive blasting, Spray painting, Shipbuilding, Substitutes, Emissions, Regulations, Standards compliance, Environmental impacts, Requirements, Cost analysis, Best available technology, Ship repair, Spray booths, Volatile organic compounds, PM-10.

PB94-181880/REB PC **A12**/MF **A03**
Descriptive Guide to Risk Assessment Methodologies for Toxic Air Pollutants.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Sep 93, 273p EPA/453/R-93/038
See also PB90-155581, PB90-155599, PB91-172122 and PB91-921314.

The report provides basic information and a general discussion of the steps and technical issues involved in conducting a risk assessment. It also identifies and briefly describes available risk assessment methods. This information is intended to assist State and local agencies make informed decisions on whether to conduct a risk assessment and on what methods are appropriate for a particular situation. Because method selection depends on many factors such as the goals of the risk assessment, the available information, and time and resource constraints, the report discusses key features, basic assumptions and uncertainties, inputs and outputs, potential uses, and the relative level of expertise, time, and resources needed to use each methodology.

Keywords: *Risk assessment, *Air pollution effects(Humans), *Toxic substances, Air pollutants, Public health, Toxicity, Inhalation, Carcinogens, Dose-response relationships, Environmental exposure pathway, Biochemistry, Toxicology, Epidemiology, Environmental transport, Methodology, Noncarcinogens, Environmental fate.

PB94-182045/REB PC **A02**/MF **A01**
Environmental Protection Agency, Denver, CO. Water Management Div.

Compliance Evaluation Inspection Report: Winner Foundries and Manufacturing, Inc., Arvada, Colorado. Final rept.
Science Applications International Corp., Denver, CO.
Aug 90, 8p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Water Management Div.

The report presents the findings of a compliance evaluation inspection of Winner Foundries & Manufacturing, Inc. in Arvada, Colorado, conducted on July 26, 1990. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Metal working, Aluminum castings, Permits, Discharge(Water), Standards compliance, Requirements, Recommendations, Site surveys, Colorado, Arvada(Colorado), Jefferson County(Colorado), NPDES(National Pollutant Discharge Elimination System).

PB94-182052/REB PC A02/MF A01
Environmental Protection Agency, Denver, CO. Water Management Div.
Compliance Evaluation Inspection Report: Special Products Company, Golden, Colorado. Final rept.
Science Applications International Corp., Denver, CO.
Aug 90, 10p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Water Management Div.

The report presents the findings of a compliance evaluation inspection of Special Products Company in Golden, Colorado, conducted July 27, 1990. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Agricultural equipment, Discharge(Water), Standards compliance, Requirements, Recommendations, Site surveys, Colorado, Golden(Colorado), Jefferson(Colorado), Spills, NPDES(National Pollutant Discharge Elimination System).

PB94-182060/REB PC A04/MF A01
Environmental Protection Agency, Denver, CO. Water Management Div.
Compliance Evaluation Inspection Report: Anderson and Forrester, A Division of Century International, Golden, Colorado. Final rept.
Science Applications International Corp., Denver, CO.
Aug 90, 51p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Water Management Div.

The report presents the findings of a compliance evaluation inspection of Anderson and Forrester in Golden, Colorado, conducted on July 26, 1990. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Metal working, Chemical spills, Pretreatment, Degreasing, Discharge(Water), Standards compliance, Requirements, Recommendations, Site surveys, Colorado, Golden(Colorado), Jefferson(Colorado), Rinse water, NPDES(National Pollutant Discharge Elimination System).

PB94-182078/REB PC A03/MF A01
Environmental Protection Agency, Denver, CO. Water Management Div.
Performance Audit Inspection Report: Grand County Water and Sanitation District No. 1, Grand County, Colorado. NPDES Permit No. CO0032964. Final rept.
Science Applications International Corp., Denver, CO.
Oct 92, 45p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Water Management Div.

This report presents the findings of a performance audit inspection of the Grand County Water and Sanitation District No. 1 near Winter Park, Colorado, conducted on May 28, 1992. It is part of a series of inspections of POTW dischargers.

Keywords: *Waste water treatment, *Municipal wastes, *Inspection, Water treatment, Water pollution control, Permits, Lagoons, Discharge(Water), Audits, Record keeping, Analytical methods, Requirements, Standards compliance, Recommendations, Site surveys, Colorado, POTW(Publicly Owned Treatment Works), Grand County(Colorado), Granby(Colorado), Contract laboratories, NPDES(National Pollutant Discharge Elimination System).

PB94-182094/REB PC A02/MF A01
Environmental Protection Agency, Denver, CO. Region VIII.
Compliance Evaluation Inspection Report: Lambertson Industries, Denver, Colorado. Final rept.
Science Applications International Corp., Denver, CO.
Aug 90, 8p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Region VIII.

The report presents the findings of a compliance evaluation inspection of Lambertson Industries in Denver, Colorado, conducted on July 27, 1990. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Site surveys, Discharge(Water), Standards compliance, Requirements, Recommendations, Colorado, Denver(Colorado), Denver County(Colorado), NPDES(National Pollutant Discharge Elimination System).

PB94-182102/REB PC A04/MF A01
Environmental Protection Agency, Denver, CO. Region VIII.
Compliance Evaluation Inspection Report: Swedes Custom Chrome, Grand Junction, Colorado. Final rept.
Science Applications International Corp., Denver, CO.
Jul 90, 53p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Region VIII.

The report presents the findings of a compliance evaluation inspection of Swedes Custom Chrome in Grand Junction, Colorado, conducted on June 13, 1990. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Metal finishing, Chemical effluents, Pretreatment, Permits, Runoff, Outfall, Discharge(Water), Standards compliance, Requirements, Recommendations, Site surveys, Colorado, Grand Junction(Colorado), Mesa County(Colorado), Rinse tanks, Rinse water, NPDES(National Pollutant Discharge Elimination System).

PB94-182110/REB PC A03/MF A01
Environmental Protection Agency, Denver, CO. Region VIII.
Compliance Evaluation Inspection Report: Copper Mountain Water and Sanitation District, Copper Mountain, Colorado. NPDES Permit No. CO-0021598. Final rept.
Science Applications International Corp., Denver, CO.
26 May 92, 29p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Region VIII.

The report presents the findings of a compliance evaluation inspection of the Copper Mountain Water & Sanitation District WWTP in Copper Mountain, Colorado, conducted on May 26, 1992. It is part of a series of inspections of municipal POTW dischargers.

Keywords: *Waste water treatment, *Municipal wastes, *Inspection, Water treatment, Water pollution control, Permits, Sludge treatment, Chlorination, Outfall, Laboratories, Record keeping, Analytical methods, Requirements, Standards compliance, Recommendations, Site surveys, Colorado, POTW(Publicly Owned Treatment Works), Copper Mountain(Colorado), NPDES(National Pollutant Discharge Elimination System).

PB94-182136/REB PC A07/MF A02
Geographic Index of Environmental Articles 1992.
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
C. Legg. 13 Jul 93, 150p EPA/600/R-93/111
See also PB93-116184 and PB94-182144.

This index was produced in accordance with the Environmental Research Geographic Location Information Act, Public Law 101-617, enacted by the United States Congress on November 16, 1990. Compiled by the U.S. Environmental Protection Agency, it is intended as a quick reference for locating published articles relating to environmental issues for individual geographic locations. This publication contains an extensive but limited listing of articles from forty-eight journals and five proceedings published during 1992. It is not intended to be an exhaustive listing of all publications and articles about the environmental published during that period.

Keywords: *Environmental research, *Ecology, *Bibliographies, Environment pollution, Environment management, Environmental health, Ecosystems, Regional analysis, Periodicals, Indexes(Documentation), United States, Foreign countries.

PB94-182144/REB PC A06/MF A02
Geographic Index of Environmental Articles 1991.
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
C. Legg. Nov 92, 121p EPA/600/R-92/099
See also PB93-116184 and PB94-182136.

This index was produced in accordance with the Environmental Research Geographic Location Information Act, Public Law 101-617, enacted by the United States Congress on November 16, 1990. Compiled by the Environmental Protection Agency, it is intended as a quick reference for locating published articles relating to environmental issues for individual geographic locations. This publication contains an extensive but limited listing of articles from forty-eight journals and five proceedings published during 1991. It is not intended to be an exhaustive listing of all publications and articles about the environment published during that period.

Keywords: *Environmental research, *Ecology, *Bibliographies, Environment pollution, Environment management, Environmental health, Ecosystems, Regional analysis, Periodicals, Indexes(Documentation), United States, Foreign countries.

PB94-182219/REB PC A02/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Photothermal Destruction of the Vapor of Volatile Organic Compounds. Symposium paper.
Dayton Univ., OH. Dept. of Environmental Science and Engineering.
C. T. Chen, J. L. Graham, and B. Dellinger. 20 Dec 93, 6p EPA/600/A-94/100
Grant EPA-R-819594-01-0
Pub. in Proceedings of the American Chemical Society's National Meeting (207th), San Diego, CA., March 14, 1994, v34 n1 p200-203. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The contamination of subsurface soil and groundwater by volatile organic compounds (VOCs) is a pervasive problem in the United States. However, the powerful photochemical reactions in the vapor phase have not been used for the treatment of the VOC air emission. Recently photolysis of some VOCs from soil vapor extraction (SVE) at ambient temperature was studied. The results showed that the reactioins were slow and failed to mineralize the VOCs. The authors have recently developed a photothermal process that overcomes the problems encountered previously. It has been demonstrated that the light absorbed by many VOCs increases the intensity and broadens the absorption region with a rise in temperature. It has also been shown elevated temperatures significantly increase the rate of photothermal reactions making this process a viable option for the destruction of the vapor of VOCs.

Keywords: *Photothermal conversion, *Organic compounds, *Soil pollution, *Vapors, Reprints, Extraction, Xenon, Electric arcs, Ethylene, Benzene, Heat treatment, Pollution control, Ultraviolet radiation, Absorp-

tion, *VOCs(Volatile organic compounds), HTAS(High Temperature Absorption Spectrophotometer), TCE(Trichloroethylene), MCB(Monochlorobenzene), DCB(1-2-Dichlorobenzene), SVE(Soil vapor extraction).

PB94-182227/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Laboratory Evaluation of Method 0050 for Hydrogen Chloride. Rept. for Aug 92-Aug 93.
Radian Corp., Research Triangle Park, NC.
J. Steger, D. Wagoner, J. Bursey, R. Merrill, and R. Fuerst. 1993, 20p EPA/600/A-94/101
Contract EPA-68-D1-0010, EPA-68-D1-0010
See also PB94-170313. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The U.S. Environmental Protection Agency (EPA) reference method used for collecting hydrogen chloride and chlorine in stack gas emissions is SW-846 Method 0050. In Method 0050 gaseous and particulate pollutants are withdrawn from the stack at a rate proportional to the flow rate of the gas emissions through the stack and are collected in a cyclone, on a filter, and in absorbing solutions. As the method requires, the cyclone is purged at the end of sampling with clean ambient air. These studies showed that this was an effective way to transfer the residual hydrogen chloride from the cyclone to the impingers as long as no more than 25 ml of liquid was collected in the cyclone. At very low concentrations hydrogen chloride appears to be lost in the sampling equipment before being collected in the absorbing solutions and the loss appears to increase as the moisture content of the stack emissions increase. The presence of ammonium chloride introduces a positive error under all conditions tested.

Keywords: *Hydrogen chloride, *Incineration, *Air pollution monitoring, *Waste disposal, Gaseous wastes, Hazardous materials, Stationary sources, Bias, Particulates, Chlorine, Air pollution sampling, Ammonium halides, Cyclone separators, Performance evaluation, Test methods, Chromatographic analysis, Flue gases, EPA Method 0500.

PB94-182235/REB PC **A03/MF A01**
Effects of Solar Radiation on Organic Matter Cycling: Formation of Carbon Monoxide and Carbonyl Sulfide (Chapter 11). Book chapter.
Environmental Research Lab., Athens, GA.
R. G. Zepp. c1994, 21p EPA/600/A-94/102
Pub. in Climate-Biosphere Interactions: Biogenic Emissions and Environmental Effects of Climate Change, p203-221 1994.

The effects of photoinduced processes on carbon cycling and the biospheric emission of two important trace carbon gases--carbon monoxide and carbonyl sulfide--are examined. Both of these gases are likely to play an important role in the biospheric feedbacks that may reinforce or attenuate future changes in climate. Evidence is presented to support the hypothesis that a significant fraction of the global sources of both of these gases derives from the photochemical fragmentation of decayed plant materials and other biogenic organic matter in terrestrial and marine environments.

Keywords: *Global air pollution, *Climatic changes, *Solar radiation, Photochemistry, Carbon monoxide, Organic wastes, Biosphere, Feedback, Carbon oxysulfide, Terrestrial ecosystems, Marine environments, Reprints, Biogenic emissions, Carbon cycling.

PB94-182243/REB PC **A02/MF A01**
Removal of Arsenic from Drinking Water by Conventional Treatment Methods.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
T. J. Sorg. 1993, 10p EPA/600/A-94/104
Pub. in Proceedings of the American Water Works Association, Water Quality Technology Conference, Miami, FL., November 7-11, 1993, p1991-2005.

The USEPA National Interim Primary Drinking Water Regulations (NIPDWR) established the maximum contaminant level (MCL) for arsenic at 0.05 mg/L in 1977. Several years ago the USEPA began to re-examine the arsenic health effects information and has indicated that the MCL could be significantly lower to somewhere in the .0002 to .005 mg/L range. Between 1973-79, DWRD conducted laboratory jar test studies and pilot plant studies to evaluate the effectiveness of a variety of treatment methods to remove arsenic from drinking water. The purpose of the paper is to re-examine the jar test and pilot plant information to determine if these data indicate an ability of conventional treatment methods to achieve arsenic levels below 0.005 mg/L. Radioactive tracers were employed for most of the jar test studies, therefore, the potential existed for determining absolute treatment water levels below 0.005 mg/L. Conventional treatment methods for the paper are classified as lime softening and coagulation filtration.

Keywords: *Arsenic, *Water treatment, *Drinking water, Water purification, Water softening, Demineralizing, Coagulation, Filtration, Potable water, Water supply, Contamination, Tracer techniques, Regulations, Water quality standards, Reprints, Maximum contaminant level, Liming agents.

PB94-182250/REB PC **A03/MF A01**
Descriptive Basis for a Model of Soils Biogeochemistry (Chapter 12). Book chapter.
Environmental Research Lab., Athens, GA.
R. R. Lassiter, and Y. M. Pliis. c1994, 20p EPA/600/A-94/103, ISBN-0-471-58943-3
Pub. in Climate Biosphere Interaction: Biogenic Emissions and Environmental Effects of Climate Change, p223-240 1994. Prepared in cooperation with Ukrainian Scientific Center for Water Protection, Kharkov.

A model of biogeochemical processes for use in simulating greenhouse gas production and consumption is described. The model uses kinetic equations to describe a vertically distributed soil column that is characterized physically by soil properties. Transport processes move soluble and gaseous components in the soil column, including loss of gaseous components at the soil-atmosphere interface. Biogeochemical reactions are described beginning with hydrolysis of fresh, decomposable biopolymeric material to more resistant biopolymers and to monomers. Oxidative processes remove monomers and produce by-products including greenhouse gases. These processes include aerobic decomposition in aerobic zones and denitrification and germentation in anaerobic zones. Initial testing of the model for its general behavior indicates that this approach holds promise as a component of earth system models for simulating biogeochemical cycling.

Keywords: *Climatic changes, *Global air pollution, *Environment models, *Soil chemistry, Reprints, Geochemistry, Soil properties, Kinetic equations, Soil microbiology, Transport theory, Greenhouse effect, Nitrogen cycle, Aerobic processes, Anaerobic processes, Oxidation reduction reactions, Hydrolysis, Fermentation, Bioengineering, Biogeochemical model, Greenhouse gases, Denitrification, Bipolymer decomposition, Methanogenesis.

PB94-182268/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Preparation and Evaluation of Representative Compounds in Small High Pressure Cylinders for Use as Audit Materials. Symposium proceedings.
ManTech Environmental Technology, Inc., Research Triangle Park, NC.
R. Bousquet, R. Brande, J. Duncan, J. Holland, and W. Mitchell. Apr 94, 10p EPA/600/A-94/106
Contract EPA-68-DO-0106
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

EPA currently regulates or plans to regulate over 130 organic and 20 inorganic gases as air pollutants. These compounds can be found in air matrices from 1 ppb to 1000 ppm and in different relative ratios. The presentation describes the evaluation of a gas transfer system that will allow an organization to prepare a wide variety of QA and QC audit gas mixtures using a small number of master gas mixtures. It has been used in the laboratory to prepare over 60 mixtures for use as performance evaluation and audit materials in support of the EPA regulations.

Keywords: *Air pollution standards, *Standards, *Environmental monitoring, Tests, Audits, Gas cylinders, Regulations, US EPA.

PB94-182276/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Using a Neural Network to Predict Electricity Generation. Rept. for Dec 93-May 94.
Capone (Ronald L.) and Associates, Arlington, VA.
R. L. Capone, and E. S. Kimbrough. May 94, 8p EPA/600/A-94/107
Contract EPA-68-D1-0146
Presented at the World Congress on Neural Networks, San Diego, CA., June 5-9, 1994. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

Predicting electricity generation is important to developing forecasts of air pollutant release and to evaluating the effectiveness of alternative policies which may reduce pollution. A neural network model (NUMOD) predicting electricity generation fueled by coal, natural gas, and oil (whose combustion released air pollutants) was developed to run on a personal computer. NUMOD uses three linked, feed-forward neural networks, each trained with the extended delta-bar-delta paradigm. One network predicts coal-fired generation. Its output is fed as input to each of the other two networks: one for gas-fired generation and the other for oil-fired generation. In addition, all three networks use inputs describing electricity demand, fuel prices, generating equipment, climate, and power pooling. Pearson's r calculated at various points during training, out-of-sample tests, and performance evaluation was greater than 0.93 and frequently greater than 0.98.

Keywords: *Electric power, *Power generation, *Neural networks, Fossil fuels, Natural gas, Petroleum, Coal, Combustion products, Air pollution detection, Forecasting, Power plants, Computerized simulation, Mathematical models, Reprints.

PB94-182284/REB PC **A02/MF A01**
Distribution of Areal Recharge to a Discrete Fracture Network (FRACNET) Model Using the Analytic Element Method.
Robert S. Kerr Environmental Research Lab., Ada, OK.
S. R. Kraemer. 21 Apr 94, 10p EPA/600/A-94/108
Presented at the International Conference on Analytic Element Modeling of Groundwater Flow, Indianapolis, IN., April 19-21, 1994.

Rain water filtering down through the soil will provide recharge of the saturated fractured rock aquifer. The computer model FRACNET has been designed to distribute areal recharge into linear fracture zones in order to complete the regional water balance. In the presentation, a technique for modeling regional fracture flow with areal recharge is introduced, along with a demonstration using a hypothetical problem.

Keywords: *Groundwater recharge, *Model studies, *Spatial distribution, Ground water, Aquifers, Fractured reservoirs, Infiltration rates, Zone of saturation, Fracture permeability, Saturated flow, Flow rates, Rainfall, Groundwater movement, Water balance, Areal hydrogeology, Analytical techniques, Reprints, FRACNET computer model, Analytic element modeling.

PB94-182292/REB PC **A02/MF A01**
Capture Zone Modeling Using the Wellhead Analytic Element Model (WhAEM).
Robert S. Kerr Environmental Research Lab., Ada, OK.
S. R. Kraemer, H. M. Haitjema, and O. D. L. Strack. Apr 94, 9p EPA/600/A-94/109
Presented at the International Conference on Analytic Element Modeling of Groundwater Flow, Indianapolis, IN., April 19-21, 1994. Prepared in cooperation with Indiana Univ., Bloomington. and Minnesota Univ., Minneapolis.

A new computer modeling package has been developed through cooperative agreement between Indiana University, the University of Minnesota, and the U.S. Environmental Protection Agency for the determination of time-of-travel capture zones in relatively simple geohydrological settings. The WhAEM package includes an analytic element model that uses superposition of (many) closed form analytical solutions to generate a ground-water flow solution. WhAEM consists of two executables: the preprocessor GAEP and the flow model CZAEM. WhAEM distinguishes itself from existing analytical models in that it can handle fairly re-

alistic boundary conditions such as streams, lakes, and aquifer recharge due to precipitation. The Geographical Analytic Element Preprocessor (GAEP) is designed to simplify input data preparation, specifically to facilitate the interactive process of ground-water flow modeling that supports capture zone delineation. The Capture Zone Analytic Element Model (CZAEM) is equipped with a novel algorithm to accurately define capture zone boundaries by determining all stagnation points and dividing streamlines in the flow domain.

Keywords: *Groundwater movement, *Areal hydrogeology, *Flow rates, Groundwater recharge, Infiltration rates, Saturated flow, Rainfall, Base flow, Inflow, Surface-groundwater relationships, Ground water, Aquifers, Well heads, Water balance, Analytical techniques, Regional analysis, Reprints, WhAEM computer model, CZAEM model, Analytic element modeling, Capture zones.

PB94-182300/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Carbon Pools and Flux on Forested Lands of the United States. Symposium paper.
ManTech Environmental Technology, Inc., Corvallis, OR.
H. Gucinski, D. P. Turner, C. E. Peterson, and G. Koerper. 1994, 16p EPA/600/A-94/110
Contract EPA-68-C8-0006
Pub. in Proceedings of the Workshop on Carbon Cycling in Boreal Forests and Subarctic Ecosystems, Corvallis, OR., September 1991, 14p. Sponsored by Corvallis Environmental Research Lab., OR.

The potential for global climate change due to the anthropogenic release of carbon dioxide methane, and other gases has focused attention on global forests. Forest ecosystems are a central component of the global carbon cycle and are of interest and concern for three reasons. One is the current contribution of deforestation, particularly in tropical latitudes, to the build-up of greenhouse gases. Second is the potential climate induced redistribution of the world's forests, which may result in the release of potentially large quantities of carbon. Last, there is the possibility that forests could be managed to increase the sequestering of carbon and thereby both delay the onset of climate change or diminish its magnitude. Such management could take advantage of possible benefits that may accrue from the direct effects of higher ambient CO2 levels or from the potential expansion of tropical forests due to the increased water availability predicted by some general circulation models. The paper outlines the authors' approach for estimating the carbon budget for the forest sector of the United States using existing data.

Keywords: *Carbon dioxide, *Climatic changes, *Forest management, *United States, Ecosystems, Methane, Accumulation, Tropical regions, Biomass, General circulation models, Carbon cycle, Disturbances, Harvesting, Fir trees, Age, Oregon, Carbon flux, Deforestation.

PB94-182318/REB PC **A04/MF A01**
Massachusetts Dept. of Environmental Protection, Westborough. Div. of Water Pollution Control.
Massachusetts Ecological Regions Project. Book chapter.
Corvallis Environmental Research Lab., OR.
G. E. Griffith, J. M. Omernik, S. M. Pierson, and C. W. Kiilsgaard. 29 Mar 94, 64p EPA/600/A-94/111
Color illustrations reproduced in black and white. Pub. in Commonwealth of Massachusetts Department of Environmental Protection pub., 1994. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR. Sponsored by Massachusetts Dept. of Environmental Protection, Westborough. Div. of Water Pollution Control.

Ecoregion frameworks are available tools for inventorying and assessing environmental resources, for setting resource management goals, and for developing biological criteria and water quality standards. In a collaborative project with the Massachusetts Department of Environmental Protection, Division of Water Pollution Control (DWPC), we have refined the boundaries of the U.S. Environmental Protection Agency's two major ecological regions in the Commonwealth of Massachusetts, defined 13 subregions, and mapped boundary transition widths. Lists of candidate stream reference sites have been developed for each subregion, and the sites are being examined and evaluated by DWPC staff to determine their suitability for sampling. Phosphorus and alkalinity data for lakes and streams have been collected, evaluated, mapped and analyzed to determine spatial distributions and regional patterns. The resulting regional frameworks and maps of surface water chemistry lead to a better understanding of the spatial variations in water resource conditions in Massachusetts.

Keywords: *Massachusetts, *Aquatic ecology, *Regional analysis, Surface waters, Water chemistry, Acid neutralizing capacity, Phosphorus, Water quality, Water pollution, Ecosystems, Land use, Spatial distribution, Environmental impacts, Maps, Reprints, Ecoregions.

PB94-182326/REB PC **A02/MF A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Developments in the Supercritical Fluid Extraction of Chlorophenoxy Acid Herbicides from Soil Samples. Journal article.
Midwest Research Inst., Mountain View, CA. California Operations.
V. Lopez-Avila, N. S. Dodhiwala, and W. F. Beckert. c1993, 9p EPA/600/J-94/268
Contract EPA-68-C1-0029
Pub. in Jnl. of Agricultural and Food Chemistry, v41 n1 p2038-2044 1993. Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

Extraction of chlorophenoxy acid herbicides from soil samples with supercritical carbon dioxide as extractant and tetrabutylammonium hydroxide and methyl iodide as derivatization agents was investigated. The extraction was carried out at 400 atm and 80 degrees C for 15 min static, followed by 15 min dynamic, at a carbon dioxide flow rate of approximately 1.5 mL/min (as liquid). The use of other derivatization agents (trimethylphenylammonium hydroxide, benzyltrimethylammonium chloride, and benzyltriethylammonium chloride) proved to be less effective than the tetrabutylammonium hydroxide/methyl iodide combination. (Copyright (c) 1993 American Chemical Society.)

Keywords: *Herbicides, *Soil pollution, *Extraction, Reprints, Supercritical flow, Carbon dioxide, Pollution monitoring, Remedial action, Sampling, EPA SW-846 Method 8151, In situ treatment, Chlorophenoxy acid herbicides.

PB94-182334/REB PC **A03/MF A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Evaluation of Soxtec Extraction Procedure for Extracting Organic Compounds from Soils and Sediments. Journal article.
Midwest Research Inst., Kansas City, MO.
V. Lopez-Avila, K. Bauer, J. Milanes, and W. F. Beckert. c1993, 19p EPA/600/J-94/269
Contracts EPA-68-03-3511, EPA-68-01-0029
Pub. in Jnl. of AOAC International, v76 n4 p864-882 1993. Prepared in cooperation with Mid-Pacific Environmental Lab., Mountain View, CA. Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

The U.S. EPA conducted a study to evaluate the Soxtec extraction of 29 target compounds from spiked sandy clay loam and clay loam. The study also compared two solvent mixtures and methylene chloride-acetone and investigated the effect on method recovery of five factors (matrix type, spike level, anhydrous sodium sulfate addition, total extraction time, and immersion/extraction time ratio), their two way interactions, and a three-way interactioin (matrix X spike X time). Limited experimental work was performed with 64 basic/neutral/acidic compounds spiked into clay loam and with standard reference materials certified for polynuclear aromatic hydrocarbons.

Keywords: *Extraction, *Organic compounds, *Soil pollution, *Sediments, Reprints, Loams, Test methods, Performance tests, Pesticides, Chlorohydrocarbons, Halohydrocarbons, Ethers, Nitrogen organic compounds, Hazardous materials, Technology utilization, Experimental design, Standards, Soxtec extraction, EPA Method 3540, EPA Method 3550, Sonication extraction, Semivolatile organics.

PB94-182342/REB PC **A02/MF A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Separation and Isolation of Volatile Organic Compounds Using Vacuum Distillation with GC/MS Determination. Journal article.
Lockheed Environmental Systems and Technologies Co., Las Vegas, NV.
M. H. Hiatt, D. R. Youngman, and J. R. Donnelly. c15 Mar 94, 6p EPA/600/J-94/270
Contract EPA-68-C0-0049
Pub. in Analytical Chemistry, v66 n6 p905-908, 15 Mar 94. Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

The U.S. EPA's vacuum distillation of water, soil, oil, and fish samples is presented as an alternative technique for determining volatile organic compounds (VOCs). Analysis of samples containing VOCs and non-VOCs at 50 ppb concentrations were performed to evaluate method limitations. Analyte recoveries were found to relate closely with boiling point unless a compound's water solubility exceeded 5 g/L. Recovery, precision, and method detection limits for VOCs demonstrate this technology is appropriate for environmental samples.

Keywords: *Organic compounds, *Vacuum distillation, *Pollution monitoring, Soil pollution, Water pollution, Vacuum apparatus, Point sources, Plumes, Hazardous materials, Boiling points, Precision, Remedial action, Quality assurance, Analytical chemistry, Reprints, VOCs(Volatile organic compounds).

PB94-182359/REB PC **A02/MF A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Separation of T-MAZ Ethoxylated Sorbitan Fatty Acid Esters by Reverse Phase Chromatography. Journal article.
ManTech Environmental Technology, Inc., Ada, OK.
M. Y. Ye, R. G. Walkup, and K. D. Hill. cMar 94, 7p EPA/600/J-94/271
Contracts EPA-68-C8-0025, EPA-68-C3-0322
Pub. in Jnl. of Chromatographia, v38 n5-6 p337-341 Mar 94. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

The method for determination of T-MAZ ethoxylated sorbitan fatty acid esters is described. The work demonstrates that with a less retentive C8 alkyl bonded phase packing, reverse phase chromatography can be used to analyze nonionic polymer mixtures with a molecular weight range of 900 to 1500. Using a gradient elution, a complete separation of T-MAZ oligomers was achieved, comparable to that obtained by Supercritical Fluid Chromatography (SFC). Isocratic elution is used to quantify T-MAZ and the detection limit is 321 ppm, which is acceptable for polymers with high molecular weights and no UV-absorbing chromophores. The work also shows the comparison of the separations of T-MAZ using gel permeation chromatography and reverse phase chromatography. (Copyright (c) 1994 Friedr. Vieweg & Sohn Verlagsgesellschaft mbH.)

Keywords: *Chromatography, *Polymers, *Aliphatic acid esters, Reprints, Polyoxyethylene, Separation, Elution, Molecular weight, Chemical analysis, Column packings, T-MAZ, Ethoxylated sorbitan fatty acid esters, Reverse phase chromatography, Oligomers, Gel permeation chromatography.

PB94-182367/REB PC **A02/MF A01**
Corvallis Environmental Research Lab., OR.
Comparative Toxicity of Azinphos-Methyl to House Mice, Laboratory Mice, Deer Mice, and Gray-Tailed Voles. Journal article.
ManTech Environmental Technology, Inc., Corvallis, OR.
S. M. Meyers, and J. O. Wolff. c1994, 7p EPA/600/J-94/272
Contract EPA-68-C8-0006
Pub. in Archives of Environmental Contamination and Toxicology, v26 p478-482 1994. Prepared in cooperation with Oregon State Univ., Corvallis. Dept. of Fisheries and Wildlife. Sponsored by Corvallis Environmental Research Lab., OR.

The authors conducted a laboratory toxicity study on house mice and laboratory mice, gray-tailed voles, and deer mice as part of a comprehensive laboratory and field study to field-validate laboratory-based risk assessment of argichemicals. The single dose oral LD50 for the organophosphorus insecticide azinphos-methyl was 10, 11, 32, 48 mg/kg body mass in wild house

mice, laboratory mice, gray-tailed voles, and deer mice, respectively. The authors conclude that (1) laboratory mice were not representative of deer mice or gray-tailed voles with respect to sensitivity to the pesticide, but provided a conservative estimates for risk assessment; (2) 5-d dietary LC50 tests provide substantially higher estimates of toxicity to rodents than do 10-d test; and (3) ChE depression of 45 to 50% was lethal.

Keywords: *Toxicity, *Pesticides, Insecticides, Risk assessment, Mice, Dosage, Mortality, Body weight, Field tests, Oral administration, Acute exposure, Lethal doses, Cholinesterase, Reprints, Azinphosmethyl, Guthion, Mus musculus, Microtus canicaudus, Peromyscus maniculatus, Voles.

PB94-182375/REB PC **A01**/MF **A01**
Susceptibility of the Convergent Lady Beetle ('Coleoptera: Coccinellidae') to Four Entomogenous Fungi. Journal article.
Corvallis Environmental Research Lab., OR.
R. R. James, and B. Lighthart. 1993, 5p EPA/600/J-94/273
Pub. in Environmental Entomology, v23 n1 p190-192 1994. See also PB89-211676 and PB92-217488. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR. Environmental Research Lab.

Many entomogenous fungi used as biological control agents of insect pests have broad host ranges and may infect nontarget organisms, potentially causing unanticipated environmental effects. The authors tested the susceptibility of a predatory beetle, Hippodamia convergens Guerin-Meneville, to five entomogenous fungi, all of which are being considered or used for pest control; Metarhizium anisopliae, Paecilomyces fumosoroseus, Nomuraea rileyi, and two strains of Beauveria bassiana. First-instar beetle larvae were exposed in laboratory bioassays to five concentrations of fungal preparations. M. anisopliae caused up to 97% mortality, an aphid-derived strain of B. bassiana caused up to 95% mortality, a beetle-derived strain of B. bassiana caused up to 75% mortality, and P. fumosoroseus caused up to 56% mortality. The authors conclude the M. anisopliae, B. bassiana, and P. fumosoroseus have the potential to infect H. convergens if used in crops where this predator occurs, whereas N. rileyi does not.

Keywords: *Beetles, *Pest control, *Fungi, Bioassay, Laboratory tests, Susceptibility, Coleoptera, Exposure, Concentration(Composition), Infection, Test methods, Mortality, Reprints, *Hippodamia convergens, *Nontarget species, *Microbial pest control, *Beauveria bassiana, Metarhizium anisopliae, Preditors.

PB94-182615/REB PC **A02**/MF **A01**
Multispectral Identification of Chlorine Dioxide Disinfection Byproducts in Drinking Water. Journal article.
Environmental Research Lab., Athens, GA.
S. D. Richardson, A. D. Thruston, T. W. Collette, K. S. Patterson, and B. W. Lykins. c1994, 10p EPA/600/J-94/267
Pub. in Environmental Science and Technology, v28 n4 p592-599 Apr 94. Prepared in cooperation with Georgia Univ., Athens. Dept. of Chemistry.

The paper discusses the identification of organic disinfection byproducts (DBPs) at a pilot plant in Evansville, IN, which uses chlorine dioxide as a primary disinfectant. Unconventional multispectral identification techniques (gas chromatography combined with high- and low-resolution electron-impact mass spectrometry, low-resolution chemical ionization mass spectrometry, and Fourier transform infrared spectroscopy) were used to identify more than 40 DBPs in finished water at a chlorine dioxide pilot plant in Evansville, IN. Among the more unusual compounds identified were a series of maleic anhydrides, which are believed to have been formed from maleic acids during the extraction and concentration process, and halopropanones. (Copyright (c) 1994 The American Chemical Society.)

Keywords: *Chlorine dioxide, *Water pollution detection, *Spectroscopic analysis, Water treatment, Disinfectants, Chemical analysis, Infrared spectroscopy, Mass spectroscopy, Gas chromatography, Multispectral, Maleic anhydrides, Drinking water, Potable water, Reprints, Disinfection byproducts, Halopropanones, Semivolatile organic compounds.

PB94-182631/REB PC **A02**/MF **A01**
Interagency QA Workshop Conference Review. Held in Las Vegas, Nevada on September 14, 1992. Journal article.
Environmental Monitoring Systems Lab., Las Vegas, NV.
L. R. Williams, and J. Fisk. c1993, 8p EPA/600/J-94/265
Pub. in Environemntal Testing and Analysis, p34, 36-41 May/Jun 93.

For several years, the Interagency Steering Committee on Quality Assurance for Environmental Measurements (QAEM), has sponsored a workshop to develop consistent and scientifically defensible approaches to difficult issues related to the quality of data generated in support of, or compliance with, environmental regulations. QAEM, other scientists, managers and quality professionals work to bring about constructive changes to enhance the quality of environmental data and the scientific bases upon which decisions are made. Following introductory presentations, panels of experts discuss and debate critical aspects of the issues. Areas covered include (1) data review, (2) up-front-development of data quality objectives, (3) automated data review, and (4) performance-based methods.

Keywords: *Data analysis, *Environmental monitoring, *Quality assurance, Information validation, Pollution sampling, Experimental data, Data acquisition, Data processing, Environmental materials, Standard operating procedures, Performance evaluation, Quality control, Meetings, Reprints, Environmental data, Data quality objectives, QAEM(Quality Assurance for Environmental Measurements), Analytical data.

PB94-182649/REB PC **A02**/MF **A01**
Environmental Research Lab., Narragansett, RI.
Effects of Dietary Fatty Acid Enrichment on Survival, Growth, and Salinity-Stress-Test Performance of Inland Silversides. Journal article.
Rhode Island Univ., Kingston.
M. Ashraf, D. A. Bengtson, and K. L. Simpson. c1993, 6p EPA/600/J-94/264, , ERLN-X196
Grant EPA-R-814721
Pub. in Progressive Fish Culturist 55, p280-283 1993. See also PB89-220503. Sponsored by Environmental Research Lab., Narragansett, RI.

Larvae of inland silversides (Menidia beryllina) reared on three dietary levels of highly unsaturated fatty acids (HUFA) (low HUFA, medium HUFA, and high HUFA) showed no differences in survival or growth during a 3-week feeding trail and no differences in survival during a salinity stress test at 75%. Inland silversides therefore appear to have dietary needs for (n-3) HUFA that are more like those of freshwater fish than marine fish, even though they are found in marine environments.

Keywords: *Silversides, *Diets, Animal nutrition, Survival, Aquatic animals, Growth, Salinity, Stress(Physiology), Performance tests, Aquaculture, Reprints, Inland silversides, Menidia beryllina, HUFA(Highly unsaturated fatty acids).

PB94-182656/REB PC **A03**/MF **A01**
Environmental Research Lab., Narragansett, RI.
Effects of Food Density and Temperature on Feeding and Growth of Young Inland Silversides ('Menidia beryllina'). Journal article.
Rhode Island Univ., Kingston. Dept. of Zoology.
B. H. Letcher, and D. A. Bengtson. c1993, 18p EPA/600/J-94/263, , ERLN-X195
Grant EPA-R-814721
Pub. in Jnl. of Fish Biology 43, p671-689 1993. Sponsored by Environmental Research Lab., Narragansett, RI.

Food consumption and growth rates of 7 to 28-day-old Menidia beryllina were measured in response to natural ranges of temperature and prey availability. Feeding level, temperature and age all had significant effects on growth rate, although the effect of feeding level explained most of the variance. Feeding level also had a significant effect on gross growth efficiency, but temperature and age did not. Absolute growth rates (mg per day) increased dramatically with temperature, feeding level, and age. Variability in growth was greatest for fish feeding at the lowest feeding level. For a given fish weight, temperature had a positive effect on consumption rate, and maximum consumption (C(sub max)) of any treatment combination reached 75% body weight per day. Maximum growth rate was estimated at 24.6% body weight per day, and gross growth efficiency reached an estimated maximum of 0.375 at an ingestion rate of 25% body weight per day. Starved larvae lost on average 5.4% body weight per day and larvae required 6.4% body weight food consumption per day for maintenance. Multiple regressions of feeding level, temperature, and age/size on instantaneous growth rates indicated that increases in temperature increased maintenance requirements and required that fish consume a greater proportion of C(sub max) to attain maximum growth. Growth rates decreased with increases in temperature for fish eating a specific weight of food. (Copyright (c) 1993 The Fisheries Society of the British Isles.)

Keywords: *Fresh water fishes, *Feeding habits, *Growth, Larvae, Body weight, Temperature, Aging(Biology), Reprints, *Menidia beryllina, *Silversides.

PB94-182664/REB PC **A03**/MF **A01**
Optimum Macrobenthic Sampling Protocol for Detecting Pollution Impacts in the Southern California Bight. Journal article.
Environmental Research Lab.-Narragansett, Newport, OR. Pacific Ecosystems Branch.
S. P. Ferraro, R. C. Swartz, F. A. Cole, and W. A. Deben. 1994, 29p EPA/600/J-94/262, ERLN-N052,CONTRIB-N-052
Pub. in Environmental Monitoring and Assessment 29, p127-153 1994.

The optimum macrobenthic sampling protocol (sampling unit, sieve mesh size, and sample size) was determined for detecting ecologically important pollution impacts in the Southern California Bight, U.S.A. Cost, in Laboratory processing time, was determined for samples obtained using fourteen sampling units (0.005 - 0.1 sq m surface area) and two sieve mesh sizes (1.0 and 0.5 mm). Five replicate, 0.02 sq m x 5 cm deep, 1.0 mm mesh samples per station could reliably distinguish reference from impacted conditions on nine or ten measures of community structure at less than one quarter of the cost of the standard sampling protocol of 5 replicate, 0.1 sq m, 1.0 mm mesh samples per station. About 5 replicate, small (< 0.1 sq m), 1.0 mm mesh samples per station may often be optimal for detecting important structural changes in macrobenthic communities with naturally high species richness and abundance. (Copyright (c) 1994 Kluwer Academic Publishers.)

Keywords: *Southern California Bight, *Water pollution sampling, *Benthos, Analytical techniques, Methodology, Environmental tests, Test design, Test methods, Estuaries, Aquatic ecosystems, Biological communities, Environmental impacts, Water pollution effects, Quality assurance, Statistical analysis, Reprints, *Sampling protocol, Macrobenthos.

PB94-182680/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Photothermal Detoxification of Air Toxics. Symposium paper.
Dayton Univ., OH. Research Inst.
C. T. Chen, J. L. Graham, and B. Dellinger. 10 Dec 93, 37p EPA/600/A-94/105
Contracts EPA-CR-818614-01-0, EPA-CR-819594-01-0
Presented at the American Flame Research Committee 1993 Fall International Symposium 'Impact of the Clean Air Amendment Act of 1990', Tulsa, OK., October 18-20, 1993. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab. and National Renewable Energy Lab., Washington, DC.

There has long been interest in utilizing photochemical methods for the detoxification of hazardous organic materials. Researchers at the University of Dayton Research Institute have recently developed a photothermal process that overcomes the problems previously encountered with photochemical detoxification techniques. This results in a far greater potential for air toxics to absorb near ultraviolet radiation than was previously thought. It has also been shown elevated temperatures significantly increase the rate of photothermal reactions, making this process a viable technique for the destruction of air toxics. In this paper the authors will discuss the theoretical foundation for the photothermal detoxification process, and present a summary of the work in progress to develop a Phototh-

ermal Detoxification Unit (PDU) which will include examples of high temperature absorption spectra, and the results from actual trials with a Laboratory Scale Photothermal Detoxification (LS-PDU).

Keywords: *Air pollution control, *Toxic substances, *Photothermal conversion, Photochemical reactions, Detoxification, High temperature, Incineration, Airborne wastes, Air pollutants, Mineralization, Absorption spectroscopy, Xenon, Arc lamps, Trichloroethylene, Photochemistry, Hazardous materials, Reprints, Photothermal detoxification, Volatile organic compounds, Dichlorobenzene.

PB94-182698/REB PC A03/MF A01
Environmental Protection Agency, Denver, CO. Region VIII.
Compliance Evaluation Inspection Report: Trane Company, Pueblo, Colorado. Final rept.
Science Applications International Corp., Denver, CO.
12 Jul 90, 50p
Contract EPA-68-C8-0066
Portions of this document are not fully legible. Sponsored by Environmental Protection Agency, Denver, CO. Region VIII.

The report presents the findings of a compliance evaluation inspection of the Trane Company of Pueblo, Colorado, conducted on July 12, 1990. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Metal finishing, Machining, Phosphate coatings, Pretreatment, Violations, Standards compliance, Requirements, Recommendations, Site surveys, Colorado, Pueblo(Colorado), Pueblo County(Colorado), NPDES(National Pollutant Discharge Elimination System).

PB94-182714/REB PC A03/MF A01
Environmental Protection Agency, Denver, CO. Region VIII.
Compliance Evaluation Inspection Report: Kurt Manufacturing, Pueblo, Colorado. Final rept.
Science Applications International Corp., Denver, CO.
Aug 90, 50p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Region VIII.

The report presents the findings of a compliance evaluation inspection of Kurt Manufacturing in Pueblo, Colorado, conducted on July 12, 1990. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Metal finishing, Permits, Tanks(Containers), Sludge disposal, Discharge(Water), Requirements, Standards compliance, Recommendations, Site surveys, Colorado, Pueblo(Colorado), Pueblo County(Colorado), NPDES(National Pollutant Discharge Elimination System).

PB94-182755/REB PC A03/MF A01
Environmental Protection Agency, Denver, CO. Region VIII.
Compliance Evaluation Inspection Report: Rocky Mountain Arsenal, Adams County, Colorado, NPDES No. CO-0021202. Final rept.
Science Applications International Corp., Denver, CO.
Aug 91, 38p
Contract EPA-68-C8-0066
See also PB92-964403, PB92-964405, PB93-231033, and PB94-178621. Sponsored by Environmental Protection Agency, Denver, CO. Region VIII.

The report presents the findings of a compliance evaluation inspection of the Rocky Mountain Arsenal in Adams County, Colorado, conducted on June 25, 1991. It is part of a series of inspections of municipal POTW dischargers.

Keywords: *Waste water treatment, *Municipal wastes, *Inspection, Water treatment, Water pollution control, Outfall, Runoff, Chlorination, Pretreatment, Permits, Requirements, Standards compliance, Recommendations, Site surveys, Colorado, Rocky Mountain Arsenal, Adams County(Colorado), POTW(Publicly Owned Treatment Works), NPDES(National Pollutant Discharge Elimination System).

PB94-182763/REB PC A03/MF A01
Environmental Protection Agency, Washington, DC. Office of Water.
Compliance Evaluation Inspection Report: Cosmar Company, Carville, Louisiana, NPDES Permit No. LA0003751. Final rept.
Science Applications International Corp., Paramus, NJ.
Oct 92, 22p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

The report presents the findings of a compliance evaluation inspection of the Cosmar Company in Carville, Louisiana, conducted on June 23, 1992. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Permits, Discharge(Water), Sludge disposal, Runoff, Requirements, Standards compliance, Recommendations, Site surveys, Colorado, Carville(Louisiana), Iberville Parish(Louisiana), NPDES(National Pollutant Discharge Elimination System).

PB94-182771/REB PC A03/MF A01
Environmental Protection Agency, Washington, DC. Office of Water.
Compliance Evaluation Inspection Report: Zapata Haynie Corporation, Cameron, Louisiana. NPDES No. LA0003654. Final rept.
Science Applications International Corp., Paramus, NJ.
Apr 93, 23p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Washington, DC. Office of Water.

The report presents the findings of a compliance evaluation inspection of the Zapata Haynie Corporation in Cameron, Louisiana, conducted on March 1, 1993. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Food processing, Permits, Outfall, Record keeping, Laboratories, Analytical methods, Violations, Reporting, Discharge(Water), Requirements, Standards compliance, Recommendations, Site surveys, Louisiana, Cameron(Louisiana), Cameron Parish(Louisiana), Fish processing plants, NPDES(National Pollutant Discharge Elimination System).

PB94-182789/REB PC A03/MF A01
Environmental Protection Agency, Kansas City, KS. Region VII.
Compliance Evaluation Inspection: Excel Corporation. KWPC Permit No. I-UA11-NP01. Final rept.
Science Applications International Corp., Denver, CO.
Jan 93, 39p
Contract EPA-68-C8-0066
Portions of this document are not fully legible. Sponsored by Environmental Protection Agency, Kansas City, KS. Region VII.

The report presents the findings of a compliance evaluation inspection of the Excel Corporation in Dodge City, Kansas, conducted on July 8, 1992. It is part of a series of inspections of industrial dischargers.

Keywords: *Waste water disposal, *Industrial wastes, *Inspection, Water pollution control, Industrial plants, Permits, Lagoons, Requirements, Standards compliance, Recommendations, Site surveys, Kansas, Dodge City(Kansas), Ford County(Kansas), Slaughtering houses, Slaughter house wastes, Waste water treatment plants, NPDES(National Pollutant Discharge Elimination System).

PB94-182805/REB PC A04/MF A01
Environmental Protection Agency, Denver, CO. Region VIII.
Compliance Evaluation Inspection Report: Wheatridge Sanitation District, Wheatridge, Colorado. NPDES Permit No. CO-0024121. Final rept.
Science Applications International Corp., Denver, CO.
Aug 91, 62p
Contract EPA-68-C8-0066
Sponsored by Environmental Protection Agency, Denver, CO. Region VIII.

The report presents the findings of a compliance evaluation inspection of the Wheatridge Sanitation District in Wheatridge, Colorado, conducted on May 31, 1991. It is part of a series of inspections of municipal POTW dischargers.

Keywords: *Waste water treatment, *Municipal wastes, *Inspection, Water treatment, Water pollution control, Outfall, Runoff, Sludge treatment, Filtration, Sewers, Discharge(Water), Standards compliance, Requirements, Recommendations, Site surveys, Colorado, Wheatridge(Colorado), Jefferson County(Colorado), POTW(Publicly owned treatment works), Aerated grit chambers, NPDES(National Pollutant Discharge Elimination System).

PB94-183092/REB PC A08/MF A02
Environmental Protection Agency, Washington, DC.
Lake Water Quality Assessment Grant No. 2. Final Report. (Includes Lake Water Quality Assessment Program, 1992. Northeastern Illinois Lakes). Final rept.
Illinois State Environmental Protection Agency, Springfield. Div. of Water Pollution Control.
G. Good, J. Mitzelfelt, S. Kolsto, H. L. Hudson, and K. F. Soulliere. 1994, 152p IEPA/WCP/93-140, IEPA/WCP/93-140B
Grant EPA-S995207-01
See also PB82-140815, PB93-215929 and PB94-173374. Sponsored by Environmental Protection Agency, Washington, DC.

The Illinois Environmental Protection Agency applied to the U.S. Environmental Protection Agency Region V, for a second Section 314 Federal Clean Lakes Program (CLP) Lake Water Quality Assessment (LWQA No. 2) grant in the amount of $60,000. Subsequent to a request to change the originally proposed scope of work, the grant was officially awarded to the Agency on September 17, 1991. Federal grant monies matched equally with state funds ($120,000) total project cost) were utilized to improve the quantity and quality of lake information to be reported in the 1994 cycle 305(b) report over that reported in previous cycles. The collection of lake water quality and sediment data on additional non-routinely monitored Illinois lakes from which to make 1994 cycle 305(b) lake assessments and to assess public health/aquatic life concerns.

Keywords: *Water quality data, *Water pollution sampling, *Lakes, *Reservoirs, Surface waters, Grants, Sediments, Nutrients, Phosphorus, Turbidity, Nitrogen, Inorganic nitrates, Alkalinity, pH, Dissolved oxygen, Sites, Maps, Water chemistry, Illinois, Eutrophication, Chemical oxygen demand, Thermal stratification.

PB94-183100/REB PC A08/MF A02
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Development and Testing of a Dry Deposition Algorithm (Revised). Final rept.
Sigma Research Corp., Concord, MA.
J. S. Scire, and G. E. Moore. Apr 94, 167p EPA/454/R-94/015
Contract EPA-68-D9007
Supersedes PB93-215663. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The intermedia transfer of pollutants from the atmosphere to land, water, and vegetation is an increasingly important concern in many regulatory environmental impact analyses. Recognizing the need for a generalized, scientifically-credible dry deposition algorithm capable of estimating deposition fluxes for a wide range of pollutants, the U. S. Environmental Protection Agency (EPA) has sponsored a study to develop an algorithm for use in the Industrial Source Complex (ISC) model. The primary objectives of the present study are to identify deposition models suitable for regulatory use, evaluate and intercompare several of the techniques, and implement the most appropriate approach into the ISC model. The focus on this study is the testing and evaluation of algorithms to compute deposition velocities for particulate matter.

Keywords: *Dry methods, *Deposition, *Air pollution, *Atmospheric diffusion, *Algorithms, *Particulates, Environmental transport, Mathematical models, Comparison, Revisions, Study estimates, Regulations, Statistical analysis, Computerized simulation, Plumes, Ve-

locity measurement, *Industrial Source Complex Model.

PB94-183217/REB PC **A04/MF A01**
Standard Evaluation Procedure: End-Use Product Review.
Environmental Protection Agency, Chamblee, GA. Office of Pesticides Programs.
R. Lozada, and A. M. Acierto. Feb 92, 58p EPA/737/B-92/002

The report describes the Product Chemistry Review Section (PCRS) procedures for reviewing product chemistry data for end-use products (EPs) and manufacturing-use products (MPs) that are formulated from a registered source of active ingredient (AI) or produced by an integrated system. It is important to emphasize that this SEP will address those manufacturing products that are formulated from a registered source of active ingredient or produced by an integrated system only. MPs that are not formulated from a registered source of AI and are not produced by an integrated system are addressed in the SEP for technical products. The procedures addressed here include the review of product specific data in support of new product applications, amendments to existing registrations, resubmissions and alternate formulations of MPs or EPs, the chemistry portion of the label and the Confidential Statement of Formula (CSF), EPA Form 8570-4.

Keywords: *Pesticides, *Chemical analysis, *Registration, Chemical properties, Environmental impacts, Agricultural chemicals, Reviewing, Packaging, Evaluation, Standards compliance, Regulations, Requirements, Administrative procedures, Testing, Government policies, End-use products.

PB94-183233/REB PC **A05/MF A01**
Environmental Protection Agency, Washington, DC.
Albemarle-Pamlico Baseline Water Quality Monitoring Data Summary, 1988-1991.
North Carolina Div. of Environmental Management, Raleigh. Water Quality Section.
Jan 92, 90p APES-92-01
See also PB94-156817. Sponsored by Environmental Protection Agency, Washington, DC. and Geological Survey, Raleigh, NC.

In 1988 the Division of Environmental Management (DEM) began an expanded ambient water quality monitoring program in the Albemarle-Pamlico study area. The report summarizes the water quality information for the Tar-Pamlico, Neuse, Roanoke, Chowan and Pasquotank river basins. When reviewing these results, it should be kept in mind that while the lower Pamlico and Neuse rivers are similar physically and hydrologically, the other basins in the Albemarle-Pamlico area have different salinity regimes and smaller drainage areas, and so can function in ways different from the Tar-Pamlico and Neuse. In the Neuse River basin, the productive phytoplankton community in the lower estuary is reflected in the elevated pH values, supersaturated dissolved oxygen conditions, and elevated chlorophyll-a values.

Keywords: *Environmental monitoring, *Water quality data, *Estuaries, Tar-Pamlico River, Neuse River, Roanoke River, Chowan River, Pasquotank River, Concentration(Composition), Phosphorus, Algae, Chemical analysis, Dissolved oxygen, Chlorophylls, pH, Nutrients, Salinity, Measurement, Metals, Bacteria.

PB94-183357/REB PC **A04/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Monitoring and Data Analysis Div.
Options for Reducing the Costs of Criteria Pollutant Monitoring. Final rept.
Systems Applications International, San Rafael, CA.
A. K. Pollack, and C. S. Burton. Oct 86, 69p SYSAPP-86/106, EPA/450/4-86/014
Contract EPA-68-02-3889
Prepared in cooperation with Radian Corp., Austin, TX. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Monitoring and Data Analysis Div.

The report describes the options for reducing the number of criteria pollutant monitors in operation at any given time in a State network. The authors consider reductions in monitoring for five of the six criteria pollutants: Total Suspended Particles (TSP), SO2, O3, NO2, and CO. Section 2 of the report describes the current nationwide criteria pollutant monitoring network and the data base used to evaluate the monitoring reduction options. The following two sections discuss the three options for reducing the effective number of monitors: shutting down monitors permanently, rotating monitors, and seasonal monitoring. In Section 5 the authors demonstrate the potential cost savings for an example network of 100 monitoring sites after implementation of some of the suggested options. Finally, Section 6 discusses how statistics on statewide trends can be adjusted after one or more of the suggested options are implemented and how cost-effectiveness can be optimized.

Keywords: *Air pollution monitoring, *Cost effectiveness, *Alternatives, Air pollutants, Air pollution monitors, Ozone, Carbon monoxide, Sulfur dioxide, Nitrogen dioxide, Particulates, Options, Air pollution economics, Cost estimates, Cost analysis, Variations, Criteria pollutants.

PB94-183365/REB PC **A03/MF A01**
Guideline for Lead Monitoring in the Vicinity of Point Sources. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Technical Support Div.
J. Dicke, S. Sleva, D. Lutz, D. von Lehmden, and J. Sableski. Jan 81, 32p EPA/450/4-81/006
See also PB-286 409.

The purpose of the guideline is to define the minimum criteria which should be followed when designing and operating a minimum network in the environs of lead point sources. Criteria are provided for both meteorological and ambient lead monitoring. Meteorological monitoring is needed if adequate meteorological information is not already available to ensure the proper locations of ambient lead samplers. The guideline defines minimum quality assurance requirements to ensure the collection of adequate ambient air quality data. One section discusses the data reporting procedures for the ambient lead data as well as the quality assurance data.

Keywords: *Lead(Metal), *Point sources, *Air pollution monitoring, Air pollution sources, Air pollution dispersion, Smelters, Air pollution sampling, Meteorological data, Wind(Meteorology), Precipitation(Meteorology), Quality assurance, Government policies, Pollution regulations, Ambient air quality, Requirements, Guidelines.

PB94-183373/REB PC **A04/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Technical Support Div.
Optimum Sampling Site Exposure Criteria for Lead. Final rept.
Geomet Technologies, Inc., Germantown, MD.
D. J. Pelton, and R. C. Koch. Feb 84, 65p EPA/450/4-84/012
Contract EPA-68-02-3584
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Technical Support Div.

The primary purpose of this document is to guide Federal, state, and local agencies in selecting sites for monitoring lead in the atmosphere. This guideline provides more details on site-selection procedures than do the Part 58 Regulations. This document emphasizes the concept of spatial representativeness in selecting optimum monitoring sites to meet monitoring objectives. A number of guidelines are given that can be used to identify the types of representative sites that characterize exposure to lead in any area of concern. Using these rules and knowing the objectives of a specific monitoring group, the user of this document can select the number and locations of sites that best meet monitoring needs. Specific steps are recommended for selection monitoring sites with respect to each representative type of site.

Keywords: *Lead(Metal), *Air pollution sampling, *Site selection, Air pollution monitoring, Exposure, Air pollution dispersion, Air pollution dilution, Environmental transport, Transport properties, Air pollution sources, Pollution regulations, Emission factors, Topography, Meteorological data, Criteria, Test design, Methodology.

PB94-183522/REB PC **A07/MF A02**
Alternative Control Techniques Document: NOx Emissions from Cement Manufacturing.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
W. J. Neuffer. Mar 94, 140p EPA/453/R-94/004

This alternative control technique (ACT) document provides technical information for use by State and local agencies to develop and implement regulatory programs to control NOx emissions from cement kilns. Chapter 2 presents a summary of the findings of this study. Chapter 3 provides a process description and industry characterization of cement manufacturing. A discussion of uncontrolled NOx emission levels is presented in Chapter 4. Alternative control techniques and achievable controlled emission levels are discussed in Chapter 5. Chapter 6 presents control costs and cost effectiveness for each control technique. Environmental and energy impacts associated with use of NOx control techniques are discussed in Chapter 7.

Keywords: *Air pollution control, *Nitrogen oxides, *Cement industry, *Alternatives, Air pollution standards, Pollution regulations, Industrial plants, Kilns, Combustion products, Emission factors, Emission control, Combustion efficiency, Cost analysis, Cost effectiveness, Economic impact, Environmental impacts.

PB94-183530/REB PC **A06/MF A02**
North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.
North Carolina's Estuaries: A Pilot Study for Managing Multiple Use in the State's Public Trust Waters. Final rept.
North Carolina State Univ. at Raleigh. Sea Grant Coll. Program.
W. F. Clark, and C. R. Edgerton. Nov 90, 118p APES-90-10
Sponsored by North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.

The first chapter of this report is a discussion of the current laws and regulations that impact the resources and uses of Carteret County's public trust waters. The second chapter of the report contains the model water use plan for Carteret County. The plan is divided into three sections. Section one contains a discussion of the county's key growth and water use indicators. Section two contains policies regarding use of the county's public trust waters. The policies were developed with the assistance of a citizen advisory board. The final section of Chapter Two describes the public trust waters use classification system. This system was developed to assist the county in the implementation of the model policies. Chapter Three describes different options for implementation of the model water use plan. Two options are discussed: interfacing with state commission and agencies and county ordinance development.

Keywords: *Water utilization, *Competing uses, Water management(Applied), Water consumption, Consumptive use, Non-consumptive use, Water resources, Aquatic ecosystems, Aquatic biology, Estuaries, Watershed management, Government policies, Regulations, Law enforcement, Local government, North Carolina, *Carteret County(North Carolina), Albemarle/Pamlico Estuarine Study Area.

PB94-183605/REB PC **A24/MF A04**
SO2 Guideline Document. Appendices. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
A. M. Smith. Feb 94, 572p EPA/452/R-94/008
Portions of this document are not fully legible. See also PB94-181393.

The SO2 Guideline Document Appendices is a compilation of existing policy and guidance to accompany to SO2 Guideline Document (PB94-181393).

Keywords: *Sulfur dioxide, *Air pollution control, *Pollution regulations, Air pollution monitoring, Air pollution sources, Ambient air quality, Stacks, Standards compliance, Law enforcement, Government policies, Guidelines, Manuals, Air quality modeling, New Source Performance Standards, State implementation plans.

PB94-183696/REB PC A12/MF A03
Emissions from Epoxy Resins Production and Non-Nylon Polyamides Production: Background Information for Proposed Standards.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
May 94, 260p EPA/453/R-94/033A

The draft Background Information Document (BID) chapters included in this package refer to the control of hazardous air pollutants (HAPs) from the manufacture of basic liquid epoxy resins (BLR) and wet-strength resins (WSR). These preliminary chapters provide estimates of uncontrolled and baseline HAP emissions and present information on applicable control techniques. Additionally, recommended regulatory alternatives and their economic impacts are estimated for individual facilities and entire industries.

Keywords: *Chemical industry, *Air pollution standards, *Pollution regulations, Industrial plants, Epoxy resins, Polyamides, Wet strength, Manufacturing, Air pollution control, Waste management, Emission factors, Requirements, Cost analysis, Economic impact, Environmental impacts, Implementation, Non-nylon polyamide resins, Basic liquid resins, NESHAP(National Emission Standards for Hazardous Air Pollutants), MACT(Maximum Achievable Control Technology).

PB94-183829/REB PC A03/MF A01
Interim Guidance on Interpretation and Implementation of Aquatic Life Criteria for Metals.
Environmental Protection Agency, Washington, DC. Health and Ecological Criteria Div.
May 92, 28p EPA/821/R-92/009

The guidance addresses the use of EPA (and corresponding State) metals criteria in water quality standards intended to protect aquatic life. The guidance also addresses the derivation of NPDES permit limits from such criteria. The main body of the document presents recommendations on the best current approaches for implementing aquatic life criteria metal and measuring attainment of such criteria. This guidance supersedes past criteria document statements expressing criteria in terms of an acid soluble analytical method. Appendix A presents a case study illustrating derivation of site-specific criteria. Appendix B presents recommendations on the derivation of NPDES permit limits from ambient metals criteria.

Keywords: *Metals, *Water pollution effects, *Aquatic ecosystems, Biological effects, Toxicity, Bioavailability, Aquatic biology, Environmental monitoring, Environmental impact assessments, Biological indicators, Indicator species, Sediments, Effluents, Water quality standards, Water pollution control, Chemical properties, Physical properties, *Biological criteria, Water quality criteria, NPDES(National Pollutant Discharge Elimination System).

PB94-183852/REB PC A03/MF A01
Determination of Acid Volatile Sulfide and Selected Simultaneously Extractable Metals in Sediment. Draft rept.
Environmental Research Lab., Narragansett, RI.
H. E. Allen, G. Fu, W. Boothman, D. M. DiToro, and J. D. Mahony. Dec 91, 22p EPA/821/12-91/100
Prepared in cooperation with Delaware Univ., Newark. and Manhattan Coll., Bronx, NY.

The method describes procedures for the determination of acid volatile sulfide (AVS) and for selected metals that are solubilized during the acidification step (simultaneously extracted metal, SEM). As a precipitant of toxic heavy metals, sulfide is important in controlling the bioavailability of metals in anoxic sediments. Research has established that the relative amounts of SEM and AVS are important in the prediction of potential metal bioavailability, if the molar ratio of SEM for bivalent metals to AVS exceeds one, the toxic heavy metals in that sample are potentially bioavailable. This method uses the same conditions for release of both sulfide and metal from the sediment and thus provides a useful means of assessing the amount of metal associated with sulfide.

Keywords: *Sediments, *Metals, *Acidification, Water pollution sampling, Chemical reaction kinetics, Solubility, Anaerobic conditions, Chemical analysis, Analytic techniques, Water pollution effects, Physicochemical properties, Extraction, Hydrogen sulfide, Toxicity, Biological availability, Sediment-water interfaces, *Acid volatile sulfide, SEM(Simultaneously extracted metal).

PB94-183860/REB PC A03/MF A01
Policy on the Use of Biological Assessments and Criteria in the Water Quality Program.
Environmental Protection Agency, Washington, DC. Office of Science and Technology.
May 91, 20p EPA/822/R-91/101

This policy is a significant step toward addressing all pollution problems within a watershed. It is a natural outgrowth of our greater understanding of the range of problems affecting watersheds from toxic chemicals to physical habitat alteration, and reflects the need to consider the whole picture in developing watershed pollution control strategies. The following sections of this memorandum provide a brief history of the policy development and additional information on relevant guidance.

Keywords: *Water quality standards, *Government policies, Environmental policy, Environmental monitoring, Biological effects, Aquatic ecosystems, Biological indicators, Water pollution effects, Environmental impact assessments, Water quality management, Watersheds, Habitats, Water pollution control, Pollution regulations, State government, Guidelines, *Biological criteria, Biological assessment, Water quality criteria.

PB94-183878/REB PC A03/MF A01
Quality of Our Nation's Water: 1992.
Environmental Protection Agency, Washington, DC. Office of Water.
Mar 94, 45p EPA/841/S-94/002
See also report for 1990, PB93-205904.

The 1992 Report to Congress describes the geographic extent of water pollution across the country and identifies specific pollutants and sources of pollutants contaminating our waters. The national snapshot of water quality conditions summarizes information submitted by the States, the District of Columbia, Territories, Interstate Water Basin Commissions, and one American Indian Tribe in their 1992 water quality assessment reports (required under Clean Water Act Section 305(b)). The 1992 Section 305(b) reports contain assessments of each State's water quality during 1990 and 1991.

Keywords: *United States, *Water quality, Surface waters, Ground water, Wetlands, Estuaries, Coasts, Streams, Rivers, Lakes, Reservoirs, Runoff, Water management, Acid rain, Great Lakes, Chesapeake Bay, Water pollution control, Citizen participation.

PB94-184041/REB PC A20/MF A04
Environmental Protection Agency, Research Triangle Park, NC. National Estuary Program.
Regional Inventory for Critical Natural Areas, Wetland Ecosystems, and Endangered Species Habitats of the Albemarle-Pamlico Estuarine Region: Phase 1. Final rept.
North Carolina Dept. of Environment, Health, and Natural Resources, Raleigh. Albemarle-Pamlico Estuarine Study.
C. C. Frost, H. E. LeGrand, and R. E. Schneider. Jan 90, 460p APES-90-01
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. National Estuary Program.

The report is a compilation of critical natural areas, both those already under protection and those lacking protection, in addition to a discussion of endangered and rare species, wetland ecosystems and other natural communities, and the geomorphology of the 10-county region. Data from the project will be recorded in the Natural Heritage Program's central inventory management system, which is used by many other agencies for environmental impact assessment, land use planning, resource management decisions, and conservation planning.

Keywords: *Albemarle Sound, *Pamlico Sound, *Ecosystems, *Natural resources management, Estuaries, Wetlands, Habitats, Water quality, Environmental quality, Endangered species, Species diversity, Regional analysis, Environmental surveys, North Carolina, Albemarle/Pamlico Estuarine Study Area, Critical natural areas.

PB94-184165/REB PC A23/MF A04
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Alternative Control Techniques Document: NOx Emissions from Utility Boilers.
Radian Corp., Research Triangle Park, NC.
S. Stamey-Hall. Mar 94, 532p EPA/453/R-94/023
Contract EPA-68-D1-0117
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

This alternative control techniques (ACT) document provides technical information for State and local agencies to use in developing and implementing regulatory programs to control NOx emissions from fossil fuel-fired utility boilers. A summary of the findings from this study is presented in chapter 2.0. Descriptions of fossil fuel-fired utility boilers are given in chapter 3.0. A discussion of uncontrolled and baseline NOx emissions from utility boilers is presented in chapter 4.0. Alternative NOx control techniques and expected levels of performance are discussed in chapter 5.0. Chapter 6.0 discusses costs and cost effectiveness of each NOx control technique. Chapter 7.0 discusses the environmental and energy impacts associated with NOx control techniques. Information used to derive the costs of each NOx control technology is contained in appendix A.

Keywords: *Boilers, *Nitrogen oxides, *Air pollution control, *Alternatives, Public utilities, Exhaust emissions, Fuel oils, Fuel consumption, Combustion products, Combustion efficiency, Emission factors, Air pollution control equipment, Air pollution standards, Pollution regulations, Standards compliance, Environmental impacts, Economic impact, Cost analysis, Cost effectiveness, Air pollution economics.

PB94-184249/REB PC A02/MF A02
PR Notice 94-1. Notice to Manufacturers, Producers, Formulators, Distributors, and Registrants of Pesticide Products. Withdrawal of PR Notice 91-8.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
25 Apr 94, 6p EPA/737/N-94/007

Effective immediately, EPA is withdrawing PR Notice 91-8, entitled 'Revised Policy to Provide Applicants other than Basic Manufacturers an Opportunity to Submit Generic Data and Receive Data Compensation for It.' That notice requested the use of a generic label statement on manufacturing use products (MPs) to effect this policy. Persons who have compiled with PR Notice 91-8 may retain such statements or may delete them from product labelling, at their discretion.

Keywords: *Pesticides, *Regulations, *Labels, Labeling, Revisions, Government policies, Registration, Utilization, Manufacturing use products, Use patterns, Reformulation, Reregistration.

PB94-184306/REB PC A01/MF A01
PR Notice 94-2. Notice to Manufacturers, Formulators, Producers and Registrants of Pesticide Products. Recycling Empty Aerosol Pesticide Containers.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
16 May 94, 4p EPA/737/N-94/008

This notice offers registrants use of an optional label statement permitting recycling as an alternative to instructions to dispose of aerosol pesticide containers. Registrants may add a label reference to recycling the empty aerosol pesticide container.

Keywords: *Pesticides, *Recycling, *Labels, Labeling, Sprayers, Aerosol generators, Packaging, Guidelines, Solid waste disposal, *Aerosol cans, Aerosol spray containers.

PB94-184348/REB PC A07/MF A02
Comparing Risks and Setting Environmental Priorities: Overview of Three Regional Projects.
Environmental Protection Agency, Washington, DC. Office of Policy, Planning and Evaluation.
Aug 89, 140p

The report documents the process and compares the results of the first year of two-year pilot Comparative Risk projects in EPA's Regions 1, 3, and 10. The

projects use estimates of risk to human health, the environment, and economic welfare as a common measure for comparing and setting priorities among environmental problems within and across media. While the rankings are generally consistent across Regions, there were some important differences in risk for certain problems, pointing to areas where Regional priorities may differ from national priorities. In addition, causes of risk sometimes vary across Regions. These findings indicate the need for planning to account for geographic distinctions in the most effective methods for managing these risks.

Keywords: *Risk assessment, *Health hazards, *Priorities, Public health, Exposure, Environment pollution, Toxicity, Environmental impacts, Environmental transport, Ecology, Government policies, Environmental policy, Policy making, Decison making, Planning, Citizen participation, Regional analysis, *Comparative risk.

PB94-184827/REB PC **A03**/MF **A01**
Technologies and Costs for Control of Disinfection By-Products. (Appendix A).
Environmental Protection Agency, Washington, DC. Office of Water.
Jun 94, 11p
See also PB93-162998.

The technologies and costs presented in the body of the document provide information to assist the Environmental Protection Agency (EPA) in determining the national impact of potential regulations for D/DBPs. As a part of the regulatory negotiation process, a Technologies Working Group was formed to assist the negotiators in evaluating the technologies and associated costs for controlling DBPs. One of the initial tasks for the group was to evaluate the technologies and costs presented in the body of the document and to recommend any refinement of the information. The purpose of the addendum is to identify design criteria and costs developed by the Technologies Working Group that are different than those presented in the body of the document.

Keywords: *Water pollution control, *Water treatment, *Disinfectants, *Byproducts, Disinfection, Design criteria, Costs, Technology assessment, Drinking water, Regulations.

PB94-186665/REB PC **A03**/MF **A01**
Drinking Water Regulations and Health Advisories.
Environmental Protection Agency, Washington, DC. Office of Water.
May 94, 16p EPA/822/R-94/001
See also PB94-154788.

The report provides maximum contaminant level of goals, maximum contaminant levels, reference doses, and drinking water equivalent levels for over 250 organic and inorganic chemicals, radionuclides, and microbes.

Keywords: *Drinking water, *Water quality standards, *Public health, Risk assessment, Chemical compounds, Radio isotopes, Microorganisms, Children, Adults, Neoplasms, Tables(Data), Maximum contaminant level, Health advisory, Reference dose.

PB94-186731/REB PC **A03**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air Risk Information Support Center.
Summary of the Emissions Characterization and Noncancer Respiratory Effects of Wood Smoke. Final rept.
Washington Univ., Seattle.
T. V. Larson, and J. Q. Koenig. Dec 93, 48p EPA/453/R-93/036
Contract EPA-1D3253NAEX
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air Risk Information Support Center.

During the past twenty years, the use of wood has become popular as an alternative to conventional home heating fuels. The report summarizes the current state of knowledge concerning chemical composition of wood smoke, emission rates from different wood burning devices, impacts from wood burning on airborne particle levels, and the human respiratory responses to inhaled wood smoke.

Keywords: *Air pollution effects(Humans), *Respiratory disorders, *Combustion products, Public health, Risk assessment, Exposure, Physiological effects, Lungs, Inhalation, Toxicity, Smokes, Particles, Carbon monoxide, Mutagens, Chemical composition, Emissions, *Wood smoke, *Non-carcinogenic effects.

PB94-187150/REB PC **A01**/MF **A01**
Ground Water Currents: Developments in Innovative Ground Water Treatment, March 1994.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
R. Eilers. Mar 94, 4p EPA/542/N-94/002
See also PB93-203966 and PB94-149937.

Contents:
- Hydrodynamic cavitation oxidation destroys organics;
- Biosparging documented in fuel remediation study;
- Surfactant flushing research to remove organic liquids from aquifers;
- and Compilation of Ground-Water Models (a book review).

Keywords: *Ground water, *Water treatment, *Water pollution control, Aquifers, Sparging, Biological treatment, Cavitation, Flushing, Surface active substances, Surfactants, Organic compounds, Remediation, Hazardous materials, Innovative treatment technology, Biosparging, Ultraviolet oxidation.

PB94-187168/REB PC **A03**/MF **A01**
Pesticide Reregistration Progress Report, July 1991.
Environmental Protection Agency, Arlington, VA. Special Review and Reregistration Div.
Jul 91, 12p EPA-21T-1006
See also PB93-206605, PB92-224328, PB94-131729, and PB94-133832.

The report will show the status of reregistration through the third quarter of the 1991 fiscal year and will make some comparisons to the information in the first issue of the Pesticide Reregistration Progress Report, published May 1991. The report will describe the progress of reregistration in terms of chemical cases, which are groups of structurally similar chemicals or active ingredients.

Keywords: *Pesticides, Evaluating, Reviewing, Suspending, Rejection, Utilization, Administrative procedures, Toxicology, Requirements, *Reregistration.

PB94-187259/REB PC **A09**/MF **A02**
Reregistration Eligibility Decision (RED): Tebuthiuron. (List A; Case 0054).
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Apr 94, 188p EPA/738/R-94/006

The document presents the Agency's decision regarding the reregistration eligibility of the registered uses of tebuthiuron. The document consists of six sections. Section I is the introduction. Section II describes tebuthiuron, its uses, data requirements and regulatory history. Section III discusses the human health and environmental assessment based on the data available to the Agency. Section IV presents the reregistration decision for tebuthiuron. Section V discusses the reregistration requirements for tebuthiuron. Finally, VI is the Appendices which support this Reregistration Eligibility Decision.

Keywords: *Pesticides, *Urea, Amides, Fertilizers, Toxicity, Risk assessment, Humans, Animals, Exposure, Environmental transport, Chemical properties, Environmental impacts, Pollution regulations, Administrative procedures, Requirements, *Tebuthiuron, *Reregistration, Use patterns, CAS 34014-18-1.

PB94-187382/REB PC **A23**/MF **A04**
Environmental Protection Agency, Research Triangle Park, NC. Technical Support Div.
Photochemical Assessment Monitoring Stations Implementation Manual.
TRC Environmental Corp., Chapel Hill, NC.
Mar 94, 548p EPA/454/B-93/051
Contract EPA-68-D30029
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Technical Support Div.

This document is designed to familiarize State and local air authorities with the Photochemical Assessment Monitoring Stations (PAMS) program and to provide guidance for the designing PAMS monitoring networks. The document provides an explanation of the requirements of 40 CFR 58 pertaining to PAMS, specific guidance on network design and monitor siting, operational requirements, planning and approval processes, and data storage and communications systems. This document replaces the Enhanced Ozone Monitoring Network Design and Siting Criteria Guidance Document, EPA-450/4-91-033 (PB92-145390), dated November 1991.

Keywords: *Ozone, *Air pollution monitoring, *Site surveys, Nitrogen oxides, Site selection, Air pollution monitors, Ambient air quality, Emission factors, Meteorological data, Photochemical reactions, Data collection, Design criteria, Network analysis, Pollution regulations, Air polllution standards, Clean Air Act, Requirement, PAMS(Photochemical Assessment Monitoring Stations), State implementation plans, Volatile organic compounds.

PB94-187408/REB PC **A16**/MF **A03**
Status of Pesticides in Reregistration and Special Review (Rainbow Report), June 1994.
Environmental Protection Agency, Chamblee, GA. Office of Pesticides Programs.
Jun 94, 374p EPA/738/R-94/008
See also report dated Jun 93, PB93-230829.

The 'Rainbow Report' lists those pesticides that are undergoing or have completed EPA's Special Review Process, or the reregistration process mandated by FIFRA '88. It summarizes the current status of each pesticide.

Keywords: *Pesticides, *Listings, *Chemical compounds, Toxicity, Reviewing, Tables(Data), *Rainbow Report, Reregistration, Special review process, Registration status.

PB94-501194/REB CP **T05**
Toxic Substances Control Act (TSCA) Chemical Substances Inventory: Revised Inventory Synonym and Preferred Name File, January 1, 1994. Data file.
Environmental Protection Agency, Washington, DC.
Jan 94, mag tape* EPA/DF/MT-94/083
System: IBM 3090400J; MVS/ESA SP 3.1.3.DFP 3.1 operating sys. File format: EBCDIC. Utility program: See documentation. Tape not avail. in ASCII. The following attributes apply to the tape: DSNAME=TSCA.NTISSYN .ADFI, RECFM=FB, LRECL=80, BLKSIZE=3520, RECORDS=879,258 AND RECORDS=504,296. Supersedes PB93-504595. See also PB86-220795 and PB86-220803. Available in 9-track, EBCDIC only character set tape, 1600 BPI OR 6250 BPI. Documentation included; may be ordered separately as PB94-141751.

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 61,807 substances on the non-confidential Inventory file as of January 1, 1994. The EPA 'N' flag, which indicates a polymeric substance containing no free-radical initiator in its Inventory name, but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used, appears on these tapes for the appropriate polymers that were included in the 1990 Supplement. The tapes do not include this flag for polymers that were listed in the 1985 Edition. A review of the statistics for the amounts of CBI and non-CBI records on the source file and the file that produced these tapes, as well as the types of data elements selected, confirms that no TSCA CBI data are on the tapes.

Keywords: *Data file, *Environmental surveys, *Chemical compounds, Magnetic tapes, Polymers, Free radicals, Revisions, Inventories, *Toxic Substances Control Act, *Chemical Substances Inventory, CAS Registry Number, Chemical nomenclature.

PB94-501335/REB CP D02
Organic Contract Compliance Screening System (OCCSS) Software (OLM01.8 Version 6) (for Microcomputers). Software.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jan 94, 1 diskette* EPA/SW/DK-94/084
System: IBM AT/PS2 or compatible; MS DOS Version 3.3 operating system. Language: Base SAS. 2MB of RAM with memory over 640K configured as expanded memory. Hard disk with at least 10MB of available space. Printer with wide carriage or ability to compress print. Supersedes PB93-506053. See also PB93-505352 and PB94-500642.
The software is on one 5 1/4 inch diskette, 1.2M high density. File format: Executable code. Documentation included; may be ordered separately as PB92-169564.

OCCSS software is a version of a mainframe-based application developed for the U.S. Environmental Protection Agency's National Contract Laboratory Program (CLP). OCCSS is designed to automate the determination of contractural compliance and completeness of data submitted to the EPA under the Routine Analytical Services (RAS) programs of CERCLA (Comprehensive Environmental Response Compensation and Liability Act). In order to remain consistent with the mainframe system, this PC version of OCCSS is written in SAS, and requires that SAS/PC be installed on the host PC. It will load analytical data from diskettes into SAS file format, perform technical edits on data, produce technical defect and summary reports, and reproduce forms which contain defects. In addition, OCCSS includes software to assist in identifying these critical structural defects in the data format, to assist in identifying these for correction prior to performing technical edits.

Keywords: *Software, *Organic compounds, *Waste management, *Contract management, Analytical chemistry, Diskettes, Superfund, Standards, Compliance, Data base management, Hazardous materials, Data compilation, US EPA, *Organic Contract Compliance Screening System, Comprehensive Environmental Response Compensation and Liability Act, National Contract Laboratory Program.

PB94-501343/REB CP T02
Needs Survey, 1992. Data file.
Environmental Protection Agency, Washington, DC. Office of Water.
1992, mag tape* EPA/DF/MT-94/084
System: IBM 3090 operating system. Approximate bytes: 113,761,608. Other formats available as PB94-133899 (paper copy). See also PB89-215412.
Available in 9-track tape, 1600 bpi, 6250 bpi, or 3480 cartridge. Documenation included; may be ordered separately as PB94-152493.

The 1992 Needs Survey Report to Congress provides the U.S. Environmental Protection Agency's detailed estimate of the eligible capital costs to build publicly owned municipal waste water treatment facilities and capital/program development costs for other eligible activities necessary to comply with the requirements of the Clean Water Act (CWA). This includes storm water, nonpoint source and estuary programs. The survey focuses on the expanded CWA funding eligibilities under the State Revolving Fund in the 1987 Amendments to the CWA. Models were used to supplement documented needs estimates for combined sewer overflows. Models were also used to develop preliminary urban storm water and agricultural and silvicultural nonpoint source pollution control implementation costs since very little documentation of specific projects or costs was available from the States.

Keywords: *Datafile, *Sewage treatment, *Construction costs, *Municipalities, *Water pollution control, Grants, Surveys, Compliance, Documentation, Magnetic tapes, Combined sewers, Overflows, Assessments, Mathematical models, United States, *Publicly owned sewage treatment plants, *Clean Water Act and Amendments of 1987.

PB94-501467/REB CP D02
Inorganic Contract Compliance Screening System (ICCSS) Software (ILM02.1 Version 5) (for Microcomputers). Software.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1994, 1 diskette* EPA/SW/DK-94/085
System: IBM Compatible; DOS operating system, 585K. Language: Base SAS. 2 mb of RAM with memory over 640K configured as expanded memory. Hard disk with at least 10 mb of available space. Printer with wide carriage or ability to compress print. Other software which are memory resident will use up base memory and should not be on the same machine as SAS required, not available NTIS.
The software is on one 5 1/4 inch diskette, 360K double density. File format: Executable code. Documentation included; may be ordered separately as PB92-145598.

ICCSS software is a version of a mainframe-based application developed for the U.S. Environmental Protection Agency's National Contract Laboratory Program (CLP). ICCSS is designed to automate the determination of contractural compliance and completeness of data submitted to the EPA under the Routine Analytical Services (RAS) programs of CERCLA (Comprehensive Emergency Response Clean-up and Liability Act). In order to remain consistent with the mainframe system, this PC version of ICCSS is written in SAS, and requires that SAS/PC be installed on the host PC. It will load analytical data from diskettes into SAS file format, perform technical edits on data, produce technical defect and summary reports, and reproduce forms which contain defects. In addition, ICCSS includes software to assist in identifying these critical structural defects in the data format, to assist in identifying these for correction prior to performing technical edits.

Keywords: *Software, *Inorganic compounds, *Superfund, *Contract management, Laboratories, Tests, Compliance audits, Standards, Monitoring, Violations, Data management, Chemistry analysis, Diskettes, National Contract Laboratory Program, RAS(Routine Analytical Services).

PB94-501517/REB CP D01
Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) Version 0.99D (for Microcomputers). Data file.
Environmental Protection Agency, Washington, DC.
1994, 1 diskette*
System: DOS operating system, 640K. Data is self-extracting. Files are compressed. Other formats available as PB93-963510 (paper copy).
The datafile is on one 3 1/2 inch diskette, 1.44M high density. File format; Executable code.

The Integrated Exposure Uptake Biokinetic (IEUBK) is a menu-driven, user-friendly model designed to determine exposure from lead in air, water, soil, dust, diet and paint and other sources. Pharmacokinetic modeling is used to predict blood lead levels in children 6 months to 7 years of age. The four main components of the current IEUBK model are: (1) an exposure model that relates environmental lead concentrations to age-dependent intake of lead into the gastrointestinal tract; (2) an absorption model that relates lead intake into the gastrointestinal tract and lead uptake into the blood; (3) a biokinetic model that relates lead uptake in the blood to the concentrations of lead in several organ and tissue compartments; and (4) a model for uncertainty in exposure and for population variability in absorption and biokinetics. This model should be used in conjunction with the Guidance Manual for the IEUBK (NTIS order number PB93-963510).

Keywords: *Lead(Metal), *Children, *Environmental effects, *Data file, Air pollution effects(Humans), Water pollution effects(Humans), Land pollution, Food chains, Soil contamination, Paints, Dust, Biokinetic models, Toxicology, Diskettes, IEUBK(Integrated Exposure Uptake Biokinetic), IEUBK computer model, Pharmacokinetics.

PB94-501558/REB CP D03
State Acid Rain Research and Screening System (STARRSS) (Version 1.03) (for Microcomputers). Software.
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Mar 94, 1 diskette* EPA/SW/DK-94/087
System: IBM PC or compatible; DOS 3.3 or greater operating system, 500K. Language: C++. See also PB91-506469.
The software is on one 5 1/4 inch diskette, 1.2M high density. Documentation included; may be ordered separately as PB94-152550.

The Environmental Protection Agency has overseen the development of a compliance system that has been delivered to over 40 state regulatory commissions. State public utility commissions have received databases for all utilities within their jurisdiction, including multi-state holding companies and power pools. STARRSS software program gives analysts the ability to evaluate the costs and risks of specific compliance plans, and develop compliance plans through one of three STARRSS optimization methodologies. The central objective of the STARRSS system is not to identify the best compliance strategy for decision-makers, but to provide a decision-support screening tool that will help organizations identify good strategies (low cost, combined with acceptable levels of risk) that deserve detailed analysis.

Keywords: *Software, *Acid rain, *Air pollution control, *Public utilities, State government, Pollution regulations, Standards compliance, Requirements, Risk assessment, Cost effectiveness, Economic impact, Environmental impacts, Decision making, Planning, Diskettes, STARRSS computer program.

PB94-501657/REB CP D05
Meteorological Processor for Regulatory Models (MPRM) (for Microcomputers). Software.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
May 94, 1 diskette EPA/SW/DK-94/089
System: IBM PC or compatible; MS DOS 5.0 or greater operating system. Language: FORTRAN. NOTE: PKZIP software to decompress files is NOT included. Supersedes PB90-500430.
The software is on one 3 1/2 inch diskette, 1.44M high density. Documentation included; may be ordered separately as PB89-127526.

The product provides general purpose computer processor for organizing available meteorological data into a format suitable for use by air quality dispersion models. Specifically, the processor is designed to accommodate those dispersion models that have gained EPA approval for use in regulatory decision making.

Keywords: *Software, *Atmospheric diffusion, *Meteorological data, Air quality data, Air pollution dispersion, Data processing, Computerized simulation, Diskettes, Air quality dispersion models, Multiprocessors.

PB94-501749/REB CP T03
Toxic Substances Control Act (TSCA) Chemical Substances Inventory: Revised Inventory Synonym and Preferred Name File, May 1, 1994. Data file.
Environmental Protection Agency, Washington, DC.
May 94, mag tape EPA/DF/MT-94/090
System: IBM 3090400J; MVS/ESA SP 3.1.3DFP 3.1 operating system. File format: EBCDIC. Utility program: See documentation. Tape not available in ASCII. Supersedes PB93-504595.
Available in 9-track, EBCDIC only character set tape, 1600 bpi or 6250 bpi. Documentation included; may be ordered separately as PB94-165651.

The file lists more than 62,000 chemicals or chemical substances manufactured or imported for commercial purposes and regulated under the Toxic Substances Control Act (TSCA). The data on the file includes the Chemical Abstracts Service (CAS) Registry Number, Preferred CA Index Name, molecular formula, and the chemical names reported by the submitters of the data. It also contains EPA codes to identify those substances that are either subject of an EPA rule or order promulgated under TSCA or that are exempt from TSCA reporting.

Keywords: *Data file, *Chemical compounds, Nomenclature, Chemical properties, Molecular structure, Inventories, Magnetic tapes, Chemical Substances Inventory, Toxic Substances Control Act, CAS Registry Number, Molecular formula.

PB94-501822/REB CP D02
Avian Richness Evaluation Method (AREM) for Lowland Wetlands of the Colorado Plateau (User's Manual) (for Microcomputers). Software.
Corvallis Environmental Research Lab., OR.
1994, 1 diskette EPA/SW/DK-94/098
System: MS-DOS Version 3.0 or later operating system, 2MB. Language: Clipper. Files are compressed.

The software is on one 5 1/4 inch diskette, 1.2M high density. Documentation included; may be ordered separately as PB94-180551.

The software program implements the 'Avian Richness Evaluation Method' (AREM), a standardized procedure for estimating the bird species composition and richness of lowland wetlands of the Colorado Plateau. AREM gives quantitative, site-specific predictions of bird species composition and richness, rather than a value rating for habitat generally or for supposed 'indicator' species. Surveys of 76 wetlands verified its accuracy. AREM can be used for quantifying mitigation credits, diagnosing impaired wetland quality, selecting indicator species, targeting habitat enhancements, and optimizing biodiversity. Evaluations take <30 minutes; software can be modified by non-programmers to include other regions and taxa other than birds.

Keywords: *Software, *Birds, *Wetlands, Species diversity, Animal ecology, Aquatic ecosystems, Habitats, Biological diversity, Indicator species, Waterfowl, Biological indicators, Water quality, Environmental monitoring, Natural resources management, Biological surveys, Diskettes, *Colorado Plateau, AREM computer program, Avian Richness Evaluation Method.

PB94-501897/REB CP T08
Toxic Release Inventory (TRI), 1987. Data file.
Environmental Protection Agency, Washington, DC. Information Management Div.
1987, mag tape* EPA/DF/MT-94/091
System: IBM 3090; MVS/XA operating system. File format: Unlabeled. Approximate bytes: 44,266,750. Tapes must be read in sequence: B00219, B00220, B00221, and B00222, Supersedes PB93-506004. See also PB94-501905 (1988), PB94-501913 (1989), PB94-501921 (1990), PB94-501939 (1991), and PB94-501947 (1992).
Available in 9-track, ASCII character set tape, 1600 bpi, 6250 bpi, or 3480 cartridge. Documentation included; may be ordered separately as PB94-180411.

There are over 300 chemicals and categories on these lists. The reporting requirement applies to owners and operators of facilities that have 10 or more full-time employees, that are in Standard Industrial Classification (SIC) codes 20 through 39 (i.e., manufacturing facilities) and that manufacture (including importing), process or otherwise use a listed toxic chemical in excess of specified threshold quantities. The following information is required on Form R: the name, location and type of business; off-site locations to which the facility transfers toxic chemicals in waste; whether the chemical is manufactured (including importation), processed, or otherwise used and the general categories of use of the chemical; an estimate (in ranges) of the maximum amounts of the toxic chemical present at the facility at any time during the preceding year; quantity of the chemical entering each medium - air, land, and water - annually; waste treatment/disposal methods and efficiency of methods for each waste stream; optional information on waste minimization; and a certification by a senior facility official that the report is complete and accurate.

Keywords: *Data file, *Hazardous materials, *Toxic substances, Chemical effluents, Toxicity, Industrial plants, Emergency planning, Pollution regulations, Waste treatment, Waste disposal, Waste management, Magnetic tapes, Emission inventories, Chemical emissions, Emergency Planning and Community Right-to-Know Act.

PB94-501905/REB CP T07
Toxic Release Inventory (TRI), 1988. Data file.
Environmental Protection Agency, Washington, DC. Information Management Div.
1988, mag tape* EPA/DF/MT-94/092
System: IBM 3090; MVS/XA operating system. File format: Unlabeled. Approximate bytes: 47,436,400. Utility program: ADABAS/NATURAL. Tapes must be read in sequence: B00548, B00551, B00552 and B00593, Supersedes PB93-506012. See also PB94-501897 (1987), PB94-501913 (1989), PB94-501921 (1990), PB94-501939 (1991), and PB94-501947 (1992).
Available in 9-track, ASCII character set tape, 1600 bpi, 6250 bpi, or 3480 cartridge. Documentation included; may be ordered separately as PB94-180411.

There are over 300 chemicals and categories on these lists. The reporting requirement applies to owners and operators of facilities that have 10 or more full-time employees, that are in Standard Industrial Classification (SIC) codes 20 through 39 (i.e., manufacturing facilities) and that manufacture (including importing), process or otherwise use a listed toxic chemical in excess of specified threshold quantities. The following information is required on Form R: the name, location and type of business; off-site locations to which the facility transfers toxic chemicals in waste; whether the chemical is manufactured (including importation), processed, or otherwise used and the general categories of use of the chemical; an estimate (in ranges) of the maximum amounts of the toxic chemical present at the facility at any time during the preceding year; quantity of the chemical entering each medium - air, land, and water - annually; waste treatment/disposal methods and efficiency of methods for each waste stream; optional information on waste minimization; and a certification by a senior facility official that the report is complete and accurate.

Keywords: *Data file, *Hazardous materials, *Toxic substances, Chemical effluents, Toxicity, Industrial plants, Emergency planning, Pollution regulations, Waste treatment, Waste disposal, Waste management, Magnetic tapes, Emission inventories, Chemical emissions, Emergency Planning and Community Right-to-Know Act.

PB94-501913/REB CP T07
Toxic Release Inventory (TRI), 1989. Data file.
Environmental Protection Agency, Washington, DC. Information Management Div.
1989, mag tape* EPA/DF/MT-94/070
System: IBM 3090; MVS/XA operating system. File format: Unlabeled. Approximate bytes: 47,978,700. Utility program: ADABAS/NATURAL. Tapes must be read in sequence: B00260, B00499, B00503 and B00218, Supersedes PB93-506020. See also PB94-501897 (1987), PB94-501905 (1988), PB94-501921 (1990), and PB94-501947 (1992).
Available in 9-track, ASCII character set tape, 1600 bpi, 6250 bpi, or 3480 cartridge. Documentation included; may be ordered separately as PB94-180411.

There are over 300 chemicals and categories on these lists. The reporting requirement applies to owners and operators of facilities that have 10 or more full-time employees, that are in Standard Industrial Classification (SIC) codes 20 through 39 (i.e., manufacturing facilities) and that manufacture (including importing), process or otherwise use a listed toxic chemical in excess of specified threshold quantities. The following information is required on Form R: the name, location and type of business; off-site locations to which the facility transfer toxic chemicals in waste; whether the chemical is manufactured (including importation), processed, or otherwise used and the general categories of use of the chemical; an estimate (in ranges) of the maximum amounts of the toxic chemical present at the facility at any time during the preceding year; quantity of the chemical entering each medium - air, land, and water - annually; waste treatment/disposal methods and efficiency of methods for each waste stream; optional information on waste minimization; and a certification by a senior facility official that the report is complete and accurate.

Keywords: *Data file, *Hazardous materials, *Toxic substances, Chemical effluents, Toxicity, Industrial plants, Emergency planning, Pollution regulations, Waste treatment, Waste disposal, Waste management, Magnetic tapes, Emission inventories, Chemical emissions, Emergency Planning and Community Right-to-Know Act.

PB94-501921/REB CP T07
Toxic Release Inventory (TRI), 1990. Data file.
Environmental Protection Agency, Washington, DC. Information Management Div.
1990, mag tape* EPA/DF/MT-94/094
System: IBM 3090; OS/MVS operating system. Approximate bytes: 43,481,350. Utility program: ADABAS/NATURAL. Tapes must be used in sequence: B00256, B00257, B00258 and B00259. Supersedes PB93-506038. See also PB94-501905 (1987), PB94-501913 (1989), PB94-501921 (1990), PB94-501939 (1991), and PB94-501947 (1992).
Available in 9-track, ASCII character set tape, 1600 bpi, 6250 bpi, or 3480 cartridge. Documentation included; may be ordered separately as PB94-180411.

There are over 300 chemicals and categories on these lists. The reporting requirement applies to owners and operators of facilities that have 10 or more full-time employees, that are in Standard Industrial Classification (SIC) codes 20 through 39 (i.e., manufacturing facilities) and that manufacture (including importing), process or otherwise use a listed toxic chemical in excess of specified threshold quantities. The following information is required on Form R: the name, location and type of business; off-site locations to which the facility transfer toxic chemicals in waste; whether the chemical is manufactured (including importation), processed, or otherwise used and the general categories of use of the chemical; an estimate (in ranges) of the maximum amounts of the toxic chemical present at the facility at any time during the preceding year; quantity of the chemical entering each medium - air, land, and water - annually; waste treatment/disposal methods and efficiency of methods for each waste stream; optional information on waste minimization; and a certification by a senior facility official that the report is complete and accurate.

Keywords: *Data file, *Hazardous materials, *Toxic substances, Chemical effluents, Toxicity, Industrial plants, Emergency planning, Pollution regulations, Waste treatment, Waste disposal, Waste management, Magnetic tapes, Emission inventories, Chemical emissions, Emergency Planning and Community Right-to-Know Act.

PB94-501939/REB CP T07
Toxic Release Inventory (TRI), 1991. Data file.
Environmental Protection Agency, Washington, DC. Information Management Div.
1991, mag tape* EPA/DF/MT-94/094
System: IBM 3090; MVS/XA operating system. Approximate bytes: 43,481,350. Tapes must be read in sequence: B00241, B00242, B00243, B00244 and B00245, Supersedes PB93-505873. See also PB94-501897 (1987), PB94-501905 (1988), PB94-501913 (1989), PB94-501921 (1990), and PB94-501947 (1992).
Available in 9-track, ASCII character set tape, 1600 bpi, 6250 bpi, or 3480 cartridge. Documentation included; may be ordered separately as PB94-180411.

There are over 300 chemicals and categories on these lists. The reporting requirement applies to owners and operators of facilities that have 10 or more full-time employees, that are in Standard Industrial Classification (SIC) codes 20 through 39 (i.e., manufacturing facilities) and that manufacture (including importing), process or otherwise use a listed toxic chemical in excess of specified threshold quantities. The following information is required on Form R: the name, location and type of business; off-site locations to which the facility transfers toxic chemicals in waste; whether the chemical is manufactured (including importation), processed, or otherwise used and the general categories of use of the chemical; an estimate (in ranges) of the maximum amounts of the toxic chemical present at the facility at any time during the preceding year; quantity of the chemical entering each medium - air, land, and water - annually; waste treatment/disposal methods and efficiency of methods for each waste stream; optional information on waste minimization; and a certification by a senior facility official that the report is complete and accurate.

Keywords: *Data file, *Hazardous materials, *Toxic substances, Chemical effluents, Toxicity, Industrial plants, Emergency planning, Pollution regulations, Waste treatment, Waste disposal, Waste management, Magnetic tapes, Emission inventories, Chemical emissions, Emergency Planning and Community Right-to-Know Act.

PB94-501947/REB CP T07
Toxic Release Inventory (TRI), 1992. Data file.
Environmental Protection Agency, Washington, DC. Information Management Div.
1992, mag tape* EPA/DF/MT-94/095
System: IBM 3090; MVS/XA operating system. Tapes must be read in sequence: B00203, B00204, B00205, B00206, and B00207. See also PB94-501897 (1987), PB94-501905 (1988), PB94-501913 (1989), PB94-501921 (1990), and PB94-501947 (1992).
Available in 9-track, ASCII character set tape, 1600 bpi, 6250 bpi, or 3480 cartridge. Documentation included; may be ordered separately as PB94-180411.

There are over 300 chemicals and categories on these lists. The reporting requirement applies to owners and operators of facilities that have 10 or more full-time employees, that are in Standard Industrial Classifica-

tion (SIC) codes 20 through 39 (i.e., manufacturing facilities) and that manufacture (including importing), process or otherwise use a listed toxic chemical in excess of specified threshold quantities. The following information is required on Form R: the name, location and type of business; off-site locations to which the facility transfers toxic chemicals in waste; whether the chemical is manufactured (including importation), processed, or otherwise used and the general categories of use of the chemical; an estimate (in ranges) of the maximum amounts of toxic chemical present at the facility at any time during the preceding year; quantity of the chemical entering each medium - air, land, and water - annually; waste treatment/disposal methods and efficiency of methods for each waste stream; optical information on waste minimization; and a certification by a senior facility official that the report is complete and accurate.

Keywords: *Data file, *Hazardous materials, *Toxic substances, Chemical effluents, Toxicity, Industrial plants, Emergency planning, Pollution regulations, Waste treatment, Waste disposal, Waste management, Magnetic tapes, Emission inventories, Chemical emissions, Emergency Planning and Community Right-to-Know Act.

PB94-501970/REB CP D02
GENETOX Manager System: Data Management and Statistical Software for Microbial Mutagenesis Assays (Version 2.21) (for Microcomputers). Software.
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
Jun 93, 1 diskette EPA/SW/DK-94/099
Grant M
System: Compac 386; MS-DOS 3.3 or better operating system, 4MB. Language: Clipper, Fortran. Recommended: VGA graphic/ color monitor and Math Co-Processor. Files are compressed.
The software is on one 3 1/2 inch diskette, 1.44M high density.

The software is a data capture, data management, and statistical analysis program used for microbial mutagenicity data. Its main purpose is to provide a homogeneous environment for the collection, organization, and analysis of data generated in the laboratory while also supporting a quality assurance program. The system controls the data collection and management through a user-friendly, menu-driven system that requests specific information and provides uniform methods for data and information entry. GENETOX Manager is capable of performing specialized statistical analysis of the data and creating tabular and graphical summaries.

Keywords: *Software, *Mutagens, *Bioassay, Statistical analysis, Data management, Quality assurance, Standards, Testing, Test methods, Mutagenicity tests, Environmenal pollutants, Health hazards, Toxicity, Microbiology, Microorganisms, Diskettes, GENETOX computer program.

PB94-963218/REB Standing Order
This Is Superfund: A Citizen's Guide to EPA's Superfund Program.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Mar 94, 18p EPA/540/K-93/008, OSWER-9200.5-12

This report provides general information about the Superfund program. The non-technical booklet is intended for the layman who is not familiar with Superfund or hazardous waste cleanup.

Keywords: *Superfund, *Hazardous materials, *Waste management, Remediation, Pollution control, Waste treatment, Waste disposal, Waste processing, Chemical spills, Pollution regulations, Site surveys, Public information, Emergency response, Cleanup.

PB94-963224/REB Standing Order
OSWER Environmental Justice Task Force Draft Final Report.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
25 Apr 94, 70p* EPA/540/R-94/003, OSWER-9200.3-16
See also PB94-963225.
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 OSWER Environmental Justice Task Force Report describes the recommendations of the members which form a strategy for addressing the key environmental justice issues raised by the many studies and evaluations conducted over the last decade. The Task Force made a concerted effort to identify, in detail, explicit actions, both OSWER-wide and program-specific, which can be taken by Headquarters and the Regions to address the six key areas. In addition to changes in policies of development of new guidance documents, specific projects to be undertaken by the Regions are also described.

Keywords: *Environmental policy, *Law(Jurisprudence), *US EPA, Pollution regulations, Environment pollution, Law enforcement, Legal aspects, Government policies, Decision making, Environmental issues, Equity(Law), Socioeconomic factors, Program management, Environmental justice, Office of Solid Waste and Emergency Response.

PB94-963225/REB Standing Order
OSWER Environmental Justice Task Force Draft Final Report. Executive Summary.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
25 Apr 94, 20p* EPA/540/R-94/004, OSWER-9200.3-16-1
See also PB94-963224.
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,.

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Keywords: *Environmental policy, *Law(Jurisprudence), *US EPA, Pollution regulations, Environment pollution, Law enforcement, Legal aspects, Government policies, Decision making, Environmental issues, Equity(Law), Socioeconomic factors, Program management, Environmental justice, Office of Solid Waste and Emergency Response.

PB94-963237/REB Standing Order
SACM Update. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Mar 94, 2p* OSWER-9203.1-14FS
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

The bulletin is designed to keep the public apprised of significant progress in the Superfund Accelerated Cleanup Model (SACM) implementation nationwide. This issue includes topics on cross-program integration, operating procedures, eliminating the Site Inspection Prioritization backlog, and documenting successes and lessons learned.

Keywords: *Superfund, *Program management, *Regional analysis, Waste management, Hazardous materials, Implementation, Directives, Procedures, Remedial action, Interagency coordination, Cooperation, Planning, Decision making, Government policies, *SACM(Superfund Accelerated Cleanup Model).

PB94-963242/REB Standing Order
Considering Wetlands at CERCLA Sites.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
May 94, 48p* EPA/540/R-94/019, OSWER-9280.0-03
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

Two issues of considerable importance on the nation's environmental agenda are (1) loss of wetlands and other aquatic habitat, and (2) the impacts, potential or actual, to human health and the environment from Superfund sites. As EPA policy and program emphasis evolves to include a greater concern for ecological impacts, the impact of contamination from Superfund sites on wetlands values and functions is receiving greater consideration. The guidance aims to provide Superfund site managers and regional wetlands program personnel with policy guidance that will be useful when considering potential impacts of response actions on wetlands at Superfund sites. Successful coordination of the programs will achieve a greater degree of wetlands protection and a more efficient response for remediating Superfund site contamination.

Keywords: *Superfund, *Wetlands, *Pollution control, Hazardous materials, Waste management, Environmental impacts, Environmental protection, Remediation, Environmental quality, Pollution regulations, Government policies, Guidelines.

PB94-963243/REB Standing Order
Procedure for Use of USACE Preplaced Contracts to Expedite Superfund Cleanup Tasks. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 94, 4p* EPA/540/F-94/015, OSWER-9355.5-05FSA
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 and microfiche.

The U.S. Army Corps of Engineers (USACE) has procured preplaced indefinite delivery contracts to provide the EPA with streamlined, flexible access to engineering, removal, and remedial services at selected Superfund sites. The document describes each contract in terms of scope, applicability, criteria for use, response time, and procedures for accessing the contract.

Keywords: *Corps of Engineers, *Superfund, *Contract management, US EPA, Hazardous materials, Waste management, Waste disposal, Remediation, Contractors, Project management, Contracts, Contract administration, Interagency cooperation, Cleanup.

PB94-963247/REB Standing Order
Superfund Program Management Manual, Fiscal Year 1994. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Apr 94, 249p* EPA/540/R-94/021, OSWER-9200.3-14-2
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

The information in the Manual is targeted to Unit, Section, and Branch Chiefs. Its primary purpose is to provide: The primary program goals and priotities for FY94; and An overview of the Superfund program management processes (planning, accomplishment reporting and program evaluation, and resource allocation). The FY 94 Superfund Program Management Manual consists of information on: Manager's schedule of significant events; Program goals and priorities; Program planning and reporting requirements; and Financial management and FTE distribution. Appendix A contains targets/measures and definitions for site screening and assessment/regional decision, early and long-term actions, program support activities, enforcement, and Federal Facilities.

Keywords: *Superfund, *Hazardous materials, *Waste management, *Project management, Pollution control, Remediation, Pollution regulations, Decision making, Management planning, Budgeting, Financial management, Requirements, Reporting, Goals, Adminstrative procedures, Manuals, Cleanup operations.

PB94-963249/REB Standing Order
Military Base Closures: Guidance on EPA Concurrence in the Identification of Uncontaminated Parcels under CERCLA Section 120(h)(4). Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
19 Apr 94, 4p* EPA/540/F-94/32, OSWER-9345.0-09

Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

The memorandum is intended to provided guidance concerning the implementation of CERCLA section 120(h)(4). Specifically, it addresses the approach EPA should use in determining whether to concur that a parcel has been properly identified by the military service as 'uncontaminated' and therefore transferrable pursuant to CERCLA 120(h)(4).

Keywords: *Military base closings, *Hazardous materials, *Land pollution detection, Environmental impact assessments, Land use, Installation restoration, Petroleum products, Waste storage, Waste disposal, Waste management, Environmental effects, Compliance, Government policies, Superfund, CERCLA(Comprehensive Environmental Response Compensation and Liability Act)..

PB94-963253/REB Standing Order
Background Information: National Priorities List, Final Report. Volume 4, Number 1, May 1994. Intermittent bulletin.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
May 94, 32p* EPA/540/F-94/038
Also pub. as Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response rept. no. OSWER-9320.7-04I-V4-N1.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

The National Priorities List (NPL) informs the public of uncontrolled hazardous waste sites that warrant further investigation to determine if they pose risks to human health or the environment. Such sites are eligible for long-term 'remedial action' financed under the Trust Fund established by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). In October 1990, CERCLA was extended to September 30, 1994. The U.S. Environmental Protection Agency (EPA) has the primary responsibility for managing the Superfund program.

Keywords: *Superfund, *Rule making, *Hazardous materials, *Waste management, Law enforcement, Pollution control, Waste disposal, Remediation, Program management, Government policies, Technology utilization, Planning, Goals, Pollution regulations, Sites, US EPA, *National Priorities List, Cleanup.

PB94-963254/REB Standing Order
Supplementary Materials: National Priorities List, Final Rule. Volume 4, Number 2, May 1994. Intermittent bulletin.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
May 94, 30p* EPA/540/F-94/039
Also pub. as Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response rept. no. OSWER-9320.7-05I-V4-N2.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

The National Priorities List (NPL) informs the public of uncontrolled hazardous waste sites that warrant further investigation to determine if they pose risks to human health or the environment. Such sites are eligible for long-term 'remedial action' financed under the Trust Fund established by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). In October 1990, CERCLA was extended to September 30, 1994. The U.S. Environmental Protection Agency (EPA) has the primary responsibility for managing the Superfund program.

Keywords: *Superfund, *Rule making, *Hazardous materials, *Waste management, Law enforcement, Pollution control, Waste disposal, Remediation, Program management, Government policies, Technology utilization, Planning, Goals, Pollution regulations, Sites, US EPA, *National Priorities List, Cleanup.

PB94-963255/REB Standing Order
Descriptions of 42 Final Sites Added to the National Priorities List in May 1994. Volume 4, Number 3, May 1994. Intermittent bulletin.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
May 94, 45p* EPA/540/F-94/040
Also pub. as Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response rept. no. OSWER-9320.7-07I-V4-N3.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

This document consists of descriptions of the 42 final sites added to the National Priorities List (NPL) in May 1994. The size of the site is generally indicated, based on information available at the time the site was scored using the Hazard Ranking System or nominated by ATSDR Health Advisory Criteria. The size may change as additional information is gathered on the sources and extent of contamination. Sites are arranged alphabetically by site name.

Keywords: *Superfund, *Site characterization, Hazardous materials, Waste management, Site surveys, Remediation, Pollution control, Emergencies, Sites, National government, State government, Local government, Regional analysis, *National Priorities List, Cleanup.

PB94-963405/REB Standing Order
Removal Response Reporting: OSC Reports. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jun 94, 4p EPA-540/F-94/017, OSWER-9360.3-14FS
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

This fact sheet on the preparation and distribution of OSC Reports summarizes a part of the Superfund Removal Procedures (SRP) volume entitled 'Removal Response Reporting: POLREPs and OSC Reports' (OSWER Directive 9360.3-03). OSC Reports summarize activities at a site on completion of a removal action.

Keywords: *Superfund, *Waste disposal, Hazardous materials, Waste management, Emergencies, Remediation, Reporting, Site characterization, Site surveys, Accounting, Pollution regulations, *OSC(On-Site Coordinators), On-site coordinators, POLREPs(POLlution REPorts), Emergency response, Removal response, Cleanup operations.

PB94-963406/REB Standing Order
Removal Response Reporting: POLREPS. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jun 94, 4p EPA-540/F-94/018, OSWER-9360.3-15FS
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

This fact sheet on the preparation and distribution of Pollution Reports (POLREPs) summarizes a part of the Superfund Removal Procedures (SRP) volume entitled 'Removal Response Reporting: POLREPs and OSC Reports' (OSWER Directive 9360.3-03). POLREPs provide factual progressive data on removal activities.

Keywords: *Superfund, *Waste disposal, Hazardous materials, Waste management, Emergencies, Remediation, Reporting, Site characterization, Site surveys, Accounting, Pollution regulations, *POLREPS(POLlution REPorts), Pollution reports, Emergency response, Removal response, Cleanup operations, OSC(On-Site Coordinators).

PB94-963502/REB PC A03/MF A01
USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Feb 94, 46p EPA/540/R-94/013, OSWER-9240.1-05-01
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.

This document is designed to offer guidance on EPA Contract Laboratory Program (CLP) inorganic analytical data evaluation and review. In some applications it may be used as a Standard Operating Procedure (SOP). In other, more subjective areas, only general guidance is offered due to the complexities and uniqueness of data relative to specific samples. This document is intended to assist in the technical review of analytical data generated through the CLP. Determining contract compliance is not the intended objective of these guidelines. The data review process provides information on analytical limitations of data based on specific quality control (QC) criteria. In order to provide more specific usability statements, the reviewer must have a complete understanding of the intended use of the data. For this reason, it is recommended that whenever possible the reviewer obtain usability issues from the user prior to reviewing the data. When this is not possible, the user should be encouraged to communicate any questions to the reviewer.

Keywords: *Inorganic compounds, *Superfund, *Waste management, *Land pollution, Guidelines, US EPA, Evaluation, Samples, Analytical techniques, Quality control, Requirements, *Office of Solid Waste and Emergency Response, *Contract Laboratory Program, Standard operating procedures.

PB94-963503/REB Standing Order
Technical Background Document for Draft Soil Screening Level Guidance.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Mar 94, 324p* EPA/540/R-94/018, OSWER-9355.4-14-1
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy or microfiche.

The document provides technical details of the derivation of the September 30, 1993, draft Soil Screening Levels (SSLs) Guidance for Superfund (PB93-963508). The document is presented in two sections. Section I defines SSL and provides background information on the development of SSLs and their application and implementation at Superfund sites, including sampling schemes for measuring SSL attainment. It also provides draft SSLs developed for 30 chemicals. Section II provides the technical basis for the development of SSLs addressing direct ingestion of soil, inhalation of volatiles and fugitive dust, and the soil-to-ground-water exposure pathway, including the assumptions and theories used the their development.

Keywords: *Superfund, *Hazardous materials, *Soil contamination, Chemical compounds, Soil tests, Environmental transport, Chemical analysis, Site surveys, Standards, Pollution regulations, Risk assessment, Ingestion(Biology), Respiration, Soil screening level, Fugitive dust.

PB94-963614/REB PC A03/MF A01
Roles and Responsibilities of Regional Project Officers, Zone Project Officers, Work Assignment Managers and Contracting Officers for the RCRA Enforcement, Permitting and Assistance Contracts (REPA). Directive.
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
22 Feb 94, 16p OSWER-9972.00
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.

This directive sets out the roles and responsibilities of the Regional Project Officers (RPOs), Headquarters Zone Project Officers (ZPOs), Work Assignment Managers (WAMs) and Contracting Officers (COs) of the RCRA Enforcement Permitting and Assistance (REPA) Contracts.

Keywords: *Superfund, *Waste management, *Hazardous materials, *Contractor personnel, Contracts, Contractors, Law enforcement, Compliance, Permits, Regulations, Administrative procedures, *Office of

Solid Waste and Emergency Response, *REPA contracts, Resource Conservation and Recovery Act, Headquarters zone project officers, Regional project officers, Work assignment managers.

AD-A277 094/9/REB PC **A03**/MF **A01**
Minimizing Pollution in Cleaning and Degreasing Operations. Final rept. 14 Feb 89-10 Oct 91.
Auburn Univ., AL. Dept. of Chemical Engineering.
S. G. Howell, A. R. Tarrer, and H. J. Sanjay. Nov 93, 46p AL/EQ-TR-1993-0024
Contract EPA-CR-816219-01

The objective of this study was to examine approaches to decreasing rates of loss by evaporation and extending the useful lifetime of metal-cleaning solvents in service as means to decrease the generation of pollutant emissions and residues from Air Force cleaning and degreasing operations. An earlier study correlated properties of cleaning solvents with cleaning performance. This report includes data from an experimental study in which the same properties are measured in solvents that had been removed from service for recovery. Also included is an evaluation of the operation and maintenance of several degreasers in operation at Tinker AFB, together with specific suggestions to decrease the rate of evaporative loss. In the test, a measured volume of spent TCA was delivered into the sump of a recirculating filtration system. During recirculation, water content and color intensity decreased with reasonable consistency, while the acid acceptance value (AAV) remained essentially constant. Solvent, Recovery, CFC-113, 1 1 1-Trichloroethane, PD-680, Filtration, Distillation, Stabilizers.

Keywords: *Cleaning, *Metals, *Solvents, *Pollution, Air force, Colors, Consistency, Distillation, Emission, Evaporation, Filtration, Intensity, Maintenance, Operation, Pollutants, Rates, Recirculation, Reduction, Residues, Sumps, Test and evaluation, Trichloroethanes, Greases, *Degreasing, *Materials recovery, *Waste utilization, *Air pollution abatement, CFC-113, PD-680, Stablizers.

AD-A279 308/1/REB PC **A19**/MF **A04**
Inventory of Exposure-Related Data Systems Sponsored By Federal Agencies.
Eastern Research Group, Inc., Lexington, MA.
May 92, 438p EPA-600/R-92/078
Also included with AD-M000 346.

This report, an Inventory of Exposure-Related Data Systems Sponsored by Federal Agencies, is a compilation of information on federally managed data systems that contain exposure information. These systems access collections of analytical results that assess environmental media such as air, soil, water, as well as analytical results from food, human samples, or bulk chemicals. The Inventory focuses on data systems that: (1) Contain information on a large geographic area (i.e., national, regional, state, or region of a state-excluding individual research studies of limited scope); (2) Have data or summary documents that are generally available for research or other purposes; and (3) Are supported, at least in part, by public funds.

Keywords: *Data bases, *Exposure(General), *Environmental protection, Data acquisition, Data management, Epidemiology, Risk, Questionnaires, Food poisoning, Adverse conditions, Bulk chemicals.

N94-28276/1/REB
(Order as N94-28268/8/REB, PC **A12**/MF **A03**)
Progress in the Study of Global Change in China.
National Environmental Protection Agency, Beijing (China).
R. Ye. 1992, 8p
In Science and Technology Agency, Asia-Pacific Seminar on Global Change Research Cooperation p 95-102.

The Chinese government's efforts to cope with the global change are outlined. The following topics are included: (1) global climate change, including setting up historic climate data bank, developments of the model for prediction of climate change, inauguration of the inventory of CO2 emission sources, influence of methane emission from paddy fields to climate change, climate change observation and greenhouse gas monitoring throughout the country; (2) protection of biological diversity, of which serious loss is caused by human activity, such as biological resources exploration; (3) research on acid precipitation; and (4) stratospheric ozone layer protection, including active part played by Chinese government in the montreal protocol on ozone depleting substances.

Keywords: *Change detection, *Climate change, *Environmental monitoring, *Remote sensing, Acid rain, China, Ozone depletion, *Foreign technology, *Air pollution.

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NTIS Order Number/Media Code Price Codes	PB94-100443/REB	PC A10/MF A03

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PB94-173119/REB PC E99/MF E99

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PB94-156791/REB PC A10/MF A03

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PB94-183522/REB PC A07/MF A02

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PB94-156718/REB PC A07/MF A02

Alternative Control Techniques Document: Surface Coating of Automotive/Transportation and Business Machine Plastic Parts.
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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	**RECYCLED MATERIALS**
Title	Engineering and Environmental Aspects of Recycled Materials for Highway Construction
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PB94-163672/REB PC A03/MF A01

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Uptake of Planar Polychlorinated Biphenyls and 2,3,7,8-Substituted Polychlorinated Dibenzofurans and Dibenzo-p-dioxins by Birds Nesting in the Lower Fox River and Green Bay, Wisconsin, USA.
PB94-163680/REB PC A03/MF A01

EPA/600/J-94/190
Repsonses of Juvenile Largemouth Bass to Different pH and Aluminum Levels at Overwintering Temperatures: Effects on Gill Morphology, Electrolyte Balance, Scale Calcium, Liver Glycogen, and Depot Fat.
PB94-163698/REB PC A03/MF A01

EPA/600/J-94/191
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PB94-163706/REB PC A03/MF A01

EPA/600/J-94/193
pH-Dependent Toxicity of Cd, Cu, Ni, Pb and Zn to 'Ceriodaphnia dubia', 'Pimephales promelas', 'Hyalella azteca' and 'Lumbriculus variegatus'.
PB94-163722/REB PC A02/MF A01

EPA/600/J-94/194
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PB94-163730/REB PC A02/MF A01

EPA/600/J-94/195
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PB94-163748/REB PC A02/MF A01

EPA/600/J-94/196
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PB94-163763/REB PC A01/MF A01

EPA/600/J-94/198
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EPA/600/J-94/199
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EPA/600/J-94/200
Aluminum Alters Calcium Transport in Plasma Membrane and Endoplasmic Reticulum from Rat Brain.
PB94-163797/REB PC A02/MF A01

EPA/600/J-94/201
Aluminum Decreases Muscarinic, Adrenergic and Metabotropic Receptor-Stimulated Phosphoinositide Hydrolysis in Hippocampal and Cortical Slices from Rat Brain.
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EPA/600/J-94/202
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EPA/600/J-94/204
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EPA/600/J-94/208
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EPA/600/J-94/209
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PB94-163888/REB PC A03/MF A01

EPA/600/J-94/210
Acute and Long-Term Effects of a Single Dose of the Fungicide Carbendazim (Methyl 2-Benzimidazole Carbamate) on the Male Reproductive System in the Rat.
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EPA/600/J-94/219
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EPA/600/J-94/220
Fluorescence Assessment of the Maximum Quantum Efficiency of Photosynthesis in the Western North Atlantic.
PB94-169950/REB PC A03/MF A01

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Animo Acid Composition of Suspended Particles, Sediment-Trap Material, and Benthic Sediment in the Potomac Estuary.
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Bacterial Growth Efficiency on Natural Dissolved Organic Matter.
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EPA/600/J-94/252
Evaluation of Potential Confounding Factors in Sediment Toxicity Tests with Three Freshwater Benthic Invertebrates.
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QSARs for Photoinduced Toxicity: 1. Acute Lethality of Polycyclic Aromatic Hydrocarbons to 'Daphnia magna'.
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Influence of Age on the Relative Sensitivity of 'Hyalella azteca' to Diazinon, Alkylphenol Ethoxylates, Copper, Cadmium, and Zinc.
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EPA/600/J-94/256
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PB94-161130/REB PC A03/MF A01

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PB94-183217/REB PC A04/MF A01

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PB94-161916/REB PC A02/MF A01

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PB94-184249/REB PC A02/MF A02

EPA/737/N-94/008
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EPA/738/F-93/011
RED Facts: Glyphosate.
PB94-163417/REB PC A02/MF A01

EPA/738/F-93/016
RED Facts: Tris(hydroxymethyl)-nitromethane.
PB94-168135/REB PC A02/MF A01

EPA/738/F-93/024
RED Facts: 2-((Hydroxymethyl)-amino)ethanol.
PB94-168077/REB PC A01/MF A01

EPA/738/F-94/002
RED Facts: Methiocarb.
PB94-168069/REB PC A02/MF A01

EPA/738/R-93/017
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