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April-June 1992

United States
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EPA

EPA Publications Bibliography

Quarterly Abstract Bulletin

PB92-904202
April-June 1992

EPA PUBLICATIONS BIBLIOGRAPHY

QUARTERLY ABSTRACT BULLETIN

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SAMPLE ENTRY

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

EPA PUBLICATIONS BIBLIOGRAPHY
Quarterly Abstract Bulletin

PB91-205500/REB PC$200.00
EPA Publications Bibliography 1984-1990. Part 1. Report Summaries. Part 2. Indexes.
Environmental Protection Agency, Washington, DC.
Dec 90, 3690p*
See also PB-265920 and PB84-158500.

The bibliography consolidates into one publication all reports previously published in the EPA Publications Bibliography, Quarterly Abstract Bulletin from 1984 through 1990. It is published in two parts. Part 1 contains bibliographic citations with abstracts. Part 2 contains seven indexes: Title, Keyword, Sponsoring EPA Office, Corporate Author, Personal Author, Contract/Grant Number and NTIS Order/Report Number. Two cumulated bibliographies of EPA reports precede the publication. EPA Publications Bibliography, 1970-1976 (order number PB-265920) contains reports generated by EPA and its predecessor agencies. The EPA Publications Bibliography, Quarterly Abstract Bulletin, is published by NTIS as a current awareness subscription service. Bibliographic records of all EPA reports in the NTIS collection are contained in the NTIS Bibliographic Database and are searchable online through various commercial vendors. Copies of individual reports are available in paper or microfiche form. Prices for reports listed with NTIS price codes may be determined by consulting the price code list published in the most recent EPA Publications Bibliography, Quarterly Abstract Bulletin or by requesting a current schedule from NTIS.

Keywords: *US EPA, *Environmental research, *Documents, *Bibliographies, Abstracts, Indexes(Documentation), Periodicals, Air pollution, Hazardous materials, Aquatic biology, Manuals, Water pollution control, Toxicity, Solid waste disposal, Public health, Acidification, Lakes, Forests, Biotechnology, Environmental surveys, Acid precipitation, Water pollution effects(Animals).

PB92-100080/REB PC **A05**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Guides to Pollution Prevention: The Pharmaceutical Industry. Final rept.
Jacobs Engineering Group, Inc., Pasadena, CA.
Oct 91, 82p EPA/625/7-91/017
Contract EPA-68-D8-0112
See also PB87-114369 and PB92-129139. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Pharmaceutical manufacturers generate a variety of wastes during manufacturing, maintenance, and housekeeping operations which can be reduced or minimized through source reduction and recycling. The typical waste streams are spent fermentation broths, process liquors, solvents, equipment wash water, spilled materials, off-spec products, and used processing aids. Suggestions include improvements to operational practices, solvent recycling and implementing good materials management and housekeeping practices. To help companies in the industry identify opportunities for waste reduction at their own facilities, the guide includes a set of worksheets which take the user step-by-step through an analysis of the on-site waste generating operations and the possibilities for minimizing each waste. The guide and its worksheets would also be instructive to consultants serving the pharmaceutical manufacturing industry and government agencies who regulate waste streams generated from these firms.

Keywords: *Hazardous materials, *Industrial wastes, *Pollution abatement, Materials recovery, Drugs, Manufacturing, Solvents, Waste water reuse, Waste recycling, Reduction, Improvement, Operations, Waste utilization, *Waste minimization, *Pharmaceutical industry, Point source.

PB92-105527/REB PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Volatile Organic Compound (VOC) and Particulate Matter (PM) Speciation Data System User's Manual, Version 1.4.
Radian Corp., Research Triangle Park, NC.
S. K. Lynch. Oct 91, 65p* EPA/450/4-91/027, , EPA/SW/DK-92/016A
Contract EPA-68-DO-0125
For system on diskette see, PB92-500354. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The U.S. Environmental Protection Agency (EPA) has several activities that require speciated volatile organic compound (VOC) or particulate matter (PM) profiles from several source categories. To support these activities, EPA has produced the two volume Air Emissions Species Manual (EPA-450/2-90-001 a & b). Because of the large size of the Air Emissions Species Manual, over 1500 pages, EPA has decided to discontinue making it available in hard copy format. The document contains the documentation and users guide for the data system that replaces the Air Emissions Species Manual. The document must be accompanied by the 5 1/4 inch diskette which contains the VOC and PM data bases. In addition to all of the speciation profiles contained in the Air Emissions Species Manual, 43 new particulate matter profiles have been added to the updated data system.

Keywords: *User manuals(Computer programs), *Volatile organic compounds, *Particulates, *Data base management systems, *Air pollution, Documentation, Profiles, Toxic substances, Emission factors, Pollution sources, *SPECIATE system.

PB92-105691/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Improvement of PMN Review Procedures to Estimate Protective Clothing Performance. Executive Summary Report. Final rept. Sep 89-Sep 90.
Little (Arthur D.), Inc., Cambridge, MA.
R. Goydan, A. D. Schwope, T. R. Carroll, and T. J. Stolki. Dec 91, 45p ADL-64320-10, EPA/600/2-91/059
Contract EPA-68-C9-0037
See also PB81-141624. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

In a five-year program performed with the EPA Office of Research and Development, the Chemical Engineering Branch (CEB) of the EPA Office of Toxic Substances has developed state-of-the-art tools for assessing the effectiveness of rubber and plastic protective clothing materials as barriers to chemicals. These tools were developed for use by CEB to conduct more thorough assessments of the potential for occupational exposures to new chemicals as required in the Premanufacture Notification (PMN) review process. The tools include: a computerized model for predicting the permeation of chemicals through common clothing materials using Fickian diffusion theory and the physical property data typically available from a PMN submission; guidelines for specifying permeation testing and interpreting the results of such tests, including development of a new, intermittent chemical contact permeation test method; and a manual that guides the assessment of protective clothing permeation on the basis of published data, data from CEB-prescribed testing, and the output of the predictive model. The report describes the development of these tools and lists the products delivered under the project from October 1985 through September 1990. By applying these tools, CEB can perform more thorough and efficient PMN reviews and identify other areas that require improvement in their assessments of chemical protective clothing performance.

Keywords: *Protective clothing, *Hazardous materials, *Diffusion barriers, Plastics, Synthetic elastometers, Notification procedures, Computerized simulation, Improvement, Mathematical models, Barrier materials, Estimating, Performance prediction, Permeability, Toxic materials, Chemical resistance, Diffusion, Fick laws, Risk assessment, Time dependence, Acetone, Mass transfer, Premanufacture notification, Tetrachloroethane.

PB92-106921/REB PC **A08**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Field Performance of Woodburning and Coalburning Appliances in Crested Butte during the 1989-90 Heating Season. Final rept.
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mechanical Engineering.
D. R. Jaasma, M. R. Champion, and M. Gundappa. Oct 91, 156p EPA/600/7-91/005
Grant EPA-A00818389
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The field performance of woodburning and coalburning appliances in and around Crested Butte, CO, has been evaluated. Measurements included particulate matter (PM), carbon monoxide (CO), and weekly average burn rates. Woodburning appliances included conventional airtight stoves, EPA-certified catalytic stoves, and EPA-certified noncatalytic stoves. Compared to the emissions measured from conventional stoves, the certified stoves reduced PM emission factors (g/kg) by 53% and CO emission factors by 49%. Coalburning appliances included a commercial scale boiler, a residential stoker, and hand-fired coalstove. The coalburning appliances were compared to conventional woodstoves on a grams of pollutant per joule of heat output basis. The automatically stoked coal appliances reduced PM and CO emissions by roughly 84% and 85%, respectively. The hand-fired stove was cleaner than expected, reducing PM by 55% and CO by 27%.

Keywords: *Air pollution sampling, *Heaters, *Appliances, Energy consumption, Colorado, Environmental engineering, Wood burning appliances, Coal burning appliances, Houses, Burning rate, Performance evaluation, Stoves, Colorado, Residential buildings, Quality assurance, Particles, Carbon monoxide, Crested Butte(Colorado), EPA region 8.

PB92-115005/REB PC **A99**/MF **A06**
Carpet Policy Dialogue. Compendium Report, September 27, 1991. Final rept. 21 Aug 90-27 Sep 91.
Environmental Protection Agency, Washington, DC. Office of Toxic Substances.
R. W. Leukroth. 27 Sep 91, 620p EPA/560/2-91/002

As a public outreach activity of the Carpet Policy Dialogue, the report summarizes the considerations, deliberations, accomplishments, conclusions, and recommendations reached by the Carpet Policy Dialogue during the Dialogue year (August 21, 1990 through September 27, 1991). The Compendium is an assembly of materials from the Carpet Policy Dialogue Plenary Group, and the Product Testing, Processing Engineering, and Public Communications Subgroups. The document contains background information about the EPA charge to the Dialogue to encourage voluntary product testing for total volatile organic compounds (TVOC) that emit from new carpet floor covering materials. The report describes the dialogue process, struc-

tural organization, and explains the nature of consensus and voluntary actions. It summarizes the activities and products of the three working subgroups, describes manufacturing processes for carpet floor covering and insulation materials, lists accomplishments attributed to the Carpet Policy Dialogue and other activities related to the EPA charge. The report contains eighteen (18) appendices that list Dialogue participants, describes a standardized analytical test method to obtain TVOC emissions measurements from carpet products, documents three consensus agreements, four Memoranda of Understanding, and the text of a public information brochure. The appendices also provide informative materials relevant to carpet product testing for TVOC emissions and carpet installation practices.

Keywords: *Environmental policy, *Carpets, *Floor coverings, *Volatile organic compounds, *Adhesives, *Air pollution sampling, *Information transfer, Toxic substances, Public information, Air pollution abatement, Recommendations, Indoor air pollution, Pollution regulations, Materials tests, Manufacturing, Materials specifications.

PB92-119650/REB PC A12/MF A03
Robert S. Kerr Environmental Research Lab., Ada, OK.
Identification of Sources of Ground-Water Salinization Using Geochemical Techniques.
Texas Univ. at Austin. Bureau of Economic Geology.
B. C. Richter, and C. W. Kreitler. Dec 91, 271p EPA/600/2-91/064
See also PB91-144899. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

The report deals with salt-water sources that commonly mix and deteriorate fresh ground water. It reviews characteristics of salt-water sources and geochemical techniques that can be used to identify these sources after mixing has occurred. The report is designed to assist investigators of salt-water problems in a step-by-step fashion. Seven major sources of salt water are distinguished: (1) Natural saline ground water, (2) Halite solution, (3) Sea-water intrusion, (4) Oil-and gas-field brines, (5) Agricultural effluents, (6) Saline seep, and (7) Road salting. The geographic distribution of these sources was mapped individually and together, illustrating which ones are potential sources at any given area in the United States.

Keywords: *Sea water, *Salinity, *Ground water, Geochemistry, Sources, Deicers, Highways, Salt water intrusion, Agriculture, Runoff, Sodium chloride, Concentration(Composition), Injection wells, Brines, Oil fields, Gas fields, Chlorides, Graphs(Charts), United States, Saline seep.

PB92-119940/REB PC A10/MF A03
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Proceedings of International Workshop on Research in Pesticide Treatment/Disposal/Waste Minimization. Held in Cincinnati, Ohio on February 26-27, 1991.
Science Applications International Corp., Cincinnati, OH.
Jan 92, 209p EPA/600/9-91/047
Contract EPA-68-C8-0061
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab., and Tennessee Valley Authority, Muscle Shoals, AL.

The International Workshop on Research in Pesticide Management, Disposal, and Waste Minimization was held in Cincinnati, Ohio, February 26-27, 1991. The purpose of the workshop was to provide government officials, pesticide user groups, pesticide producers and farm organizations practical solutions to pesticide treatment and disposal problems. The workshop focused on how to destroy pesticides and their residuals at low cost by the applicators and dealers. The technical program included presentations by government researchers and regulators, university agricultural station professors, industry experts and individuals involved in pesticide disposal and treatment.

Keywords: *Meetings, *Pesticides, *Waste management, *Waste treatment, Waste disposal, Pest control, Agricultural wastes, Land pollution, Water pollution control, Containers, Technology transfer, Substitutes, *Pesticide residues, Cleanup, Waste minimization, Physical chemical treatment.

PB92-119965/REB PC A04/MF A01
States' Efforts to Promote Lead-Acid Battery Recycling.
Environmental Protection Agency, Washington, DC. Office of Policy, Planning and Evaluation.
19 Nov 91, 69p EPA/530/SW-91/029

EPA is currently exploring how the Federal government and States can most effectively promote lead-acid battery recycling. In response to a request from EPA's Office of Solid Waste, the Program Evaluation Division of the Office of Policy, Planning and Evaluation conducted a study of States' lead-acid battery recycling programs. Thirty-four States and one city currently ban the disposal of lead-acid batteries. Thirty laws have additional requirements, including 'take back' provisions, which require a retailer to accept a used battery from a customer when a new one is purchased. The purpose of PED's study was to provide OSW and other offices with a quick review of the States' experience in using legislation to promote lead-acid battery recycling.

Keywords: *Lead-acid batteries, *Waste recycling, Electric batteries, State government, Pollution laws, National government, Cost recovery, Requirements, Materials recovery, Reviews, Legal aspects, Comprehensive planning.

PB92-120872/REB PC A10/MF A03
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Regional Oxidant Model (ROM) User's Guide. Part 4: The ROM System User Tutorial (Processor Network and Core Model). Final rept. for Jan 90-May 91.
Computer Sciences Corp., Research Triangle Park, NC.
S. Hallyburton, C. Maxwell, L. Millich, and J. Young. Jun 91, 211p EPA/600/8-90/063D, , EPA/SW/MT-92/023A
Contract EPA-68-01-7365
For system on magnetic tape, see PB92-500642. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The volume of the Regional Oxidant Model (ROM) User's Guide is intended to be a 'cookbook' for unloading the ROM system code and benchmark (test data) from the 19 distribution tapes. The model is run on the following computer systems: (1) VAX hardware for the preprocessors and the processor network; and (2) IBM hardware for the core model.

Keywords: *Air pollution, *Atmospheric chemistry, *Photochemical reactions, *User manuals(Computer programs), Documentation, Ozone, Data processing, Atmospheric composition, Concentration(Composition), *Regional Oxidant Model.

PB92-120914/REB PC A10/MF A03
Office of Radiation Programs, Washington, DC.
National Radon Contractor Proficiency (RCP) Program. Proficiency Report, January 1992.
ICF, Inc., Fairfax, VA.
Jan 92, 213p EPA/520/1-92/001
Contract EPA-68-D90170
See also report for 1991, PB91-221242. Sponsored by Office of Radiation Programs, Washington, DC.

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

Keywords: *Radon, *Contractors, *Air pollution abatement, *Mitigation, US EPA, State government, Requirements, Regional analysis, Buildings, Public information, Listings, Performance standards, Tables(Data), *National Radon Contractor Proficiency Program, *Indoor air pollution, Indoor Radon Abatement Act of 1988.

PB92-122217/REB PC E99/MF E99
Application for Certification 1992 Model Year Light-Duty Vehicles.
Environmental Protection Agency, Washington, DC.
1991, 21769p
Set includes PB92-122225 through PB92-122480.

No abstract available.

PB92-122225/REB PC A99/MF E06
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Trucks - Chrysler.
Chrysler Corp., Detroit, MI.
1991, 787p EPA/460/A-92/1
See also PB92-122233. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Chrysler Motors, Chrysler light duty trucks.

PB92-122233/REB PC A15/MF A03
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Trucks - Chrysler Jeep.
Chrysler Corp., Detroit, MI.
1991, 349p EPA/460/A-92/2
See also PB92-122225 and PB92-122241. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Chrysler Motors, Chrysler Jeep.

PB92-122241/REB PC **A20/MF A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Chrysler.
Chrysler Corp., Detroit, MI.
1991, 460p EPA/460/A-92/3
See also PB92-122233 and PB92-122258. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Chrysler Motors.

PB92-122258/REB PC **A13/MF A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Daihatsu.
Daihatsu Motor Co., Inc., Los Alamitos, CA.
1991, 293p EPA/460/A-92/4
See also PB92-122241 and PB92-122266. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Daihatsu Motor Company Incorporated.

PB92-122266/REB PC **A07/MF A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Federal Coach.
Federal Coach, Fort Smith, AR.
1991, 134p EPA/460/A-92/5
See also PB92-122258 and PB92-122274. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Federal Coach.

PB92-122274/REB PC **A99/MF E04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Fiat.
Fiat Research and Development, Dearborn, MI. U.S.A. Branch.
1991, 785p EPA/460/A-92/6
See also PB92-122266 and PB92-122282. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Fiat Auto R and D USA.

PB92-122282/REB PC **A99/MF A06**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Fiat Ferrari.
Fiat Research and Development, Dearborn, MI. U.S.A. Branch.
1991, 611p EPA/460/A-92/7
See also PB92-122274 and PB92-122290. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Fiat Auto R and D USA, Fiat Ferrari.

PB92-122290/REB PC **A99/MF E11**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Trucks - Ford.
Ford Motor Co., Dearborn, MI.
1991, 1007p EPA/460/A-92/8
See also PB92-122282 and PB92-122308. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Ford Motor Company, Ford light duty trucks.

PB92-122308/REB PC **A99/MF E16**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Ford.
Ford Motor Co., Dearborn, MI.
1991, 1484p EPA/460/A-92/9
See also PB92-122290 and PB92-122316. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Ford Motor Company.

PB92-122316/REB PC **A99/MF E99**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - General Motors.
General Motors Proving Ground, Milford, MI.
1991, 2208p EPA/460/A-92/10
See also PB92-122308 and PB92-122324. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), General Motors.

PB92-122324/REB PC **A08/MF A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Grumman Olson.
Grumman Olson, Inc., Sturgis, MI.
1991, 164p EPA/460/A-92/11
See also PB92-122316 and PB92-122332. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Grumman Olson.

PB92-122332/REB PC **A99/MF A06**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Honda.
American Honda Motor Co., Inc., Torrance, CA.
1991, 727p EPA/460/A-92/12
See also PB92-122324 and PB92-122340. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), American Honda Motor Company Incorporated.

PB92-122340/REB PC **A12/MF A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Hyundai.
Hyundai America Technical Center, Inc., Ann Arbor, MI.
1991, 259p EPA/460/A-92/13
See also PB92-122332 and PB92-122357. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Hyundai America Technical Center Incorporated.

PB92-122357/REB PC **A24/MF A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Isuzu.
Isuzu Technical Center of America, Novi, MI.
1991, 560p EPA/460/A-92/14
See also PB92-122340 and PB92-122365. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Isuzu Technical Center of America Incorporated.

PB92-122365/REB PC **A13/MF A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Trucks - Isuzu.
Isuzu Technical Center of America, Novi, MI.
1991, 279p EPA/460/A-92/15
See also PB92-122357 and PB92-122373. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Isuzu Technical Centers of America Incorporated, Isuzu light duty trucks.

PB92-122373/REB PC **A99/MF A06**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Trucks - Mazda.
Mazda Motor Corp., Hiroshima (Japan).
1991, 611p EPA/460/A-92/16
See also PB92-122365 and PB92-122381. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Mazda Motor Corporation, Mazda light duty trucks.

PB92-122381/REB PC **A99/MF E08**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Mazda.
Mazda Motor Corp., Hiroshima (Japan).
1991, 787p EPA/460/A-92/17
See also PB92-122373 and PB92-122399. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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 de-

vices, Evaporative emission control devices, Motor vehicles(1992 models), Mazda Motor Corporation.

PB92-122399/REB PC **A99/MF E14**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Mercedes Benz.
Mercedes-Benz of North America, Inc., Montvale, NJ.
1991, 1297p EPA/460/A-92/18
See also PB92-122381 and PB92-122407. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Mercedes Benz of North America.

PB92-122407/REB PC **A99/MF E08**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Mitsubishi.
Mitsubishi Motors Corp., Tokyo (Japan).
1991, 838p EPA/460/A-92/19
See also PB92-122399 and PB92-122415. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Mitsubishi Motor Corporation.

PB92-122415/REB PC **A05/MF A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Trucks - PAS Inc.
PAS, Inc., Troy, MI.
1991, 92p EPA/460/A-92/20
See also PB92-122407 and PB92-122423. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), PAS Incorporated, PAS light duty trucks.

PB92-122423/REB PC **A99/MF A06**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Rolls Royce.
Rolls Royce Motors, Inc., Lyndhurst, NJ.
1991, 602p EPA/460/A-92/21
See also PB92-122415 and PB92-122431. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Rolls Royce Motor Cars Incorporated.

PB92-122431/REB PC **A24/MF A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Subaru.
Subaru, Tokyo (Japan).
1991, 572p EPA/460/A-92/22
See also PB92-122423 and PB92-122449. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Subaru.

PB92-122449/REB PC **A99/MF E11**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Trucks - Toyota.
Toyota Technical Center, U.S.A., Inc., Ann Arbor, MI.
1991, 1097p EPA/460/A-92/23
See also PB92-122431 and PB92-122456. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Toyota Technical Center USA Incorporated, Toyota light duty trucks.

PB92-122456/REB PC **A08/MF A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Toyota.
Toyota Technical Center, U.S.A., Inc., Ann Arbor, MI.
1991, 163p EPA/460/A-92/24
See also PB92-122449 and PB92-122464. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Toyota Motor Company.

PB92-122464/REB PC **A99/MF E99**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Volkswagen.
Volkswagen of America, Inc., Ann Arbor, MI.
1991, 3283p EPA/460/A-92/25
See also PB92-122456 and PB92-122472. Sponsored by Environmental Protection Agency, Washington, DC. Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Volkswagon of America.

PB92-122472/REB PC **A99/MF E19**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Vehicles - Volvo Cars of North America.
Volvo of America Corp., Rockleigh, NJ.
1991, 1842p EPA/460/A-92/26
See also PB92-122464 and PB92-122480. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Volvo Cars of North America.

PB92-122480/REB PC **A21/MF A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Light-Duty Motorcycles - Yamaha.
Yamaha Motor Corp. U.S.A., Cypress, CA.
1991, 496p EPA/460/A-92/27
See also PB92-122472. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 27 reports PC E99/MF E99, PB92-122217.

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 that 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, Evaporative emission control devices, Motor vehicles(1992 models), Yamaha Motor Corporation USA, Yamaha light duty motorcycles.

PB92-122498/REB PC **E99/MF E99**
Application for Certification 1992 Model Year Heavy-Duty Vehicles.
Environmental Protection Agency, Washington, DC.
1991, 1869p
Set includes PB92-122506 through PB92-122563.

No abstract available.

PB92-122506/REB PC **A12/MF A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Heavy-Duty Chrysler Otto Cycle.
Chrysler Corp., Detroit, MI.
1991, 262p EPA/460/A-92/28
See also PB92-122514. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 7 reports PC E99/MF E99, PB92-122498.

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 that 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, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Motor vehicles(1992 models), Chrysler Motors, Chrysler Otto Cycle.

PB92-122514/REB PC **A99/MF E08**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Heavy-Duty Engines - Ford.
Ford Motor Co., Dearborn, MI.
1991, 957p EPA/460/A-92/29
See also PB92-122506 and PB92-122522. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 7 reports PC E99/MF E99, PB92-122498.

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 that 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, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Motor vehicles(1992 models), Ford Motor Company.

PB92-122522/REB PC **A06/MF A02**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Heavy-Duty Diesel Engines - Hino Motors Inc.
Hino Motors Ltd., Tokyo (Japan).
1991, 106p EPA/460/A-91/30
See also PB92-122514 and PB92-122530. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 7 reports PC E99/MF E99, PB92-122498.

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 that 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, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Motor vehicles(1992 models), Hino Motors Ltd.

PB92-122530/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.
1991, 49p EPA/460/A-91/31
See also PB92-122522 and PB92-122548. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 7 reports PC E99/MF E99, PB92-122498.

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 that 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, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Motor vehicles(1992 models), Mercedes Benz Truck Company Incorporated.

PB92-122548/REB PC **A04/MF A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Heavy-Duty Diesel Engines - Mitsubishi Motors Corporation.
Mitsubishi Motors Corp., Tokyo (Japan).
1991, 68p EPA/460/A-92/32
See also PB92-122530 and PB92-122555. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 7 reports PC E99/MF E99, PB92-122498.

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 that 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, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Motor vehicles(1992 models), Mitsubishi Motors Corporation.

PB92-122555/REB PC **A10/MF A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1992 Model Year Heavy-Duty Diesel Engines - Nissan.
Nissan Diesel America, Inc., Irving, TX.
1991, 217p EPA/460/A-92/33
See also PB92-122548 and PB92-122563. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 7 reports PC E99/MF E99, PB92-122498.

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 that 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, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Motor vehicles(1992 models), Nissan Diesel America Incorporated.

PB92-122563/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).
1991, 210p EPA/460/A-91/34
See also PB92-122555. Sponsored by Environmental Protection Agency, Washington, DC.
Also available in set of 7 reports PC E99/MF E99, PB92-122498.

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 that 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, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Motor vehicles(1992 models), Perkins Technology Limited.

PB92-124759/REB PC **E99**
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Mining Sites on the National Priorities List: NPL Site Summary Reports.
Science Applications International Corp., Falls Church, VA.
21 Jun 91, 4201p-in 5v
Set includes PB92-124767 through PB92-124809.Portions of this document are not fully legible. Sponsored by Environmental Protection Agency, Washington, DC. Office of Solid Waste.

No abstract available.

PB92-124767/REB PC **A99**
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Mining Sites on the National Priorities List: NPL Site Summary Reports. Volume 1 (Aluminum Company of America (Vancouver Smelter) to Cleveland Mill). Draft rept. (Final).
Science Applications International Corp., Falls Church, VA.
V. Houseman. 21 Jun 91, 955p EPA/530/SW-91/065A
Contract EPA-68-W0-0025
See also Volume 2, PB92-124775.Portions of this document are not fully legible. Sponsored by Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Also available in set of 5 reports PC E99, PB92-124759.

Volume I of the Mining Sites on the National Priorities List contains the following NPL Site Summary Reports: Aluminum Company of America (Vouncouver Smelter), Anaconda Smelter, Atlas Asbestos Mine, Bunker Hill Mining and Metallurgical Complex, California Gulch, Carson River, Celtor Chemical Works, Cherokee County/Galena Subsite, Cimarron Mining Corp., Clear Creek/Central City, and Cleveland Mill.

Keywords: *Mine wastes, *Waste management, *Tailings, Superfund, Ore processing, Site surveys, Environmental surveys, Water pollution, Land pollution, Remedial action, Industrial wastes, Smelting, Ecology, Environment transport, Pollution regulations, Hazardous materials, Air pollution, *National Priorities List, Waste minimization.

PB92-124775/REB PC **A99**
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Mining Sites on the National Priorities List: NPL Site Summary Reports. Volume 2 (Commencement Bay Nearshore/Tideflats to Kerr McGee) (Kress Creek, Reed-Keppler Park, Residential Areas, Sewage Treatment Plant). Draft rept. (Final).
Science Applications International Corp., Falls Church, VA.
V. Houseman. 21 Jun 91, 850p EPA/530/SW-91/065B
Contract EPA-68-W0-0025
See also Volume 1, PB92-124767 and Volume 3, PB92-124783.Portions of this document are not fully legible. Sponsored by Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Also available in set of 5 reports PC E99, PB92-124759.

Volume II of the Mining Sites on the National Priorities List contains the following NPL Site Summary Reports: Commencement Bay Nearshore/Tideflats, Denver Radium, Eagle Mine East Helena Smelter, Eastern Michaud Flats Contamination Area, Glen Ridge/Montclair/West Orange/US Radium, Homestake Mill, Iron Mountain Mine, Johns-Manville Coalinga Asbestos Mill, Kerr-McGee (Kress Creek, Reed-Keppler Park, Residential Areas, Sewage Treatment Plant).

Keywords: *Mine wastes, *Waste management, *Tailings, Superfund, Water pollution, Air pollution, Land pollution, Site surveys, Ore processing, Industrial wastes, Hazardous materials, Remedial action, Radioactive wastes, Smeltering, Pollution regulations, Ecology, Environmental surveys, *National Priorities List, Waste minimization.

PB92-124783/REB PC **A99**
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Mining Sites on the National Priorities List: NPL Site Summary Reports. Volume 3 (Kerr-McGee Chemical Corp. (Soda Springs Plant) to Ormet Corp). Draft rept. (Final).
Science Applications International Corp., Falls Church, VA.
V. Houseman. 21 Jun 91, 907p EPA/530/SW-91/065C
Contract EPA-68-W0-0025
See also Volume 2, PB92-124775 and Volume 4, PB92-124791.Portions of this document are not fully legible. Sponsored by Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Also available in set of 5 reports PC E99, PB92-124759.

Volume III of the Mining Sites on the National Priorities List contains the following NPL Site Summary Reports: Kerr-McGee Chemical Corp. (Soda Springs Plant), Lincoln Park, Martin Marietta Reduction Facility, Midvale Slag (Valley Materials Slag), Milltown Reservoir Sediments, Monsanto Chemical Company, Monticello Mill Site, Monticello Vicinity Properties, Mouat Industries, and Ormet Corporation.

Keywords: *Mine wastes, *Waste management, *Tailings, Superfund, Radioactive wastes, Chemical compounds, Hazardous materials, Site surveys, Environmental surveys, Industrial wastes, Materials recovery, Ecology, Pollution regulations, Ore processing, Land pollution, Water pollution, Air pollution, Remedial action, *National Priorities List, Waste minimization.

PB92-124791/REB PC **A99**
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Mining Sites on the National Priorities List: NPL Site Summary Reports. Volume 4 (Oronogo-Duenweg Mining Belt to Tar Creek). Draft rept. (Final).
Science Applications International Corp., Falls Church, VA.
V. Houseman. 21 Jun 91, 874p EPA/530/SW-91/065D
Contract EPA-68-W0-0025
See also Volume 3, PB92-124783 and Volume 5, PB92-124809.Portions of this document are not fully legible. Sponsored by Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Also available in set of 5 reports PC E99, PB92-124759.

Volume IV of the Mining Sites on the National Priorities List contains the following NPL Site Summary Reports: Oronogo-Deunweg Mining Belt, Palmerton Zinc, Sharon Steel/Midvale Tailings, Silver Bow Creek/Butte Area Site, Silver Mountain Mine, Smuggler Mountain, St. Louis Airport/Hazelwood Interim/Futura Coatings, Sulphur Bank Mercury Mine, and Tar Creek.

Keywords: *Mine wastes, *Waste management, *Tailings, Superfund, Site surveys, Environmental surveys, Ore processing, Industrial wastes, Ecology, Air pollution, Land pollution, Remedial action, Pollution regulations, Radioactive wastes, Water pollution, *National Priorities List, Waste minimization.

PB92-124809/REB PC **A99**
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Mining Sites on the National Priorities List: NPL Site Summary Reports. Volume 5 (Teledyne Wah Chang to Wayne Interim Storage Facility/W.R. Grace). Draft rept. (Final).
Science Applications International Corp., Falls Church, VA.
V. Houseman. 21 Jun 91, 615p EPA/530/SW-91/065E
Contract EPA-68-W0-0025
See also Volume 4, PB92-124791.Portions of this document are not fully legible. Sponsored by Environmental Protection Agency, Washington, DC. Office of Solid Waste.
Also available in set of 5 reports PC E99, PB92-124759.

Volume V of the Mining Sites on the National Priorities List contains the following NPL site summary reports: Teledyne Wah Chang, Tex-Tin Corp., Torch Lake, United Nuclear Corporation/Churchrock Site, U.S. Tatanium, Uravan Uranium Mill, Whitewood Creek, and Wayne Interim Storage Facility/W. R. Grace.

Keywords: *Mine wastes, *Waste management, *Tailings, Metals, Superfund, Radioactive wastes, Hazardous materials, Site surveys, Uranium mines, Environmental surveys, Waste storage, Ecology, Air pollution, Ore processing, Remedial action, Industrial wastes, Agricultural wastes, Law enforcement, Pollution regulations, Land pollution, Water pollution, *National Priorities List, Waste minimization.

PB92-126739/REB PC **A04/MF A01**
Reregistration Eligibility Document (RED): Warfarin.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Jun 91, 51p EPA/540/RS-92/164
See also PB82-140716, PB92-126747, and PB92-126754.

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 Reregistration Eligibility Document (or RED) discusses the scientific data and other information supporting EPA's regulatory conclusion that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, Guidelines, Regulations, Standards, Oxygen organic compounds, Toxicology, Ecology, Manufacturing, Risk assessment, Biological effects, Tables(Data), Genetics, Environmental impact assessments, Labels, Rodenticides, Public health, Agricultural products, *Reregistration, *Warfarin, Federal Insecticide Fungicide and Rodenticide Act, Coumarin/(acetonylbenzyl)-hydroxy, Coumarin/(acetonylbenzyl)-hydroxy-(sodium-salt), CAS 81-81-2.

PB92-126747/REB PC **A06/MF A02**
Reregistration Eligibility Document (RED): Warfarin. Appendices C-H.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Jun 91, 113p EPA/540/RS-92/167
See also PB92-126739 and PB92-126754.

The report is the second part to the document entitled (Reregistration Eligibility Document (RED) Warfarin EPA Number 540/RS-92-164. This part contains Appendices c-h. 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 Reregistration Eligibility Document (or RED) discusses the scientific data and other information supporting EPA's regulatory conclusion that products containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration.

Keywords: *Pesticides, *Toxic substances, *Notification procedures, Regulations, Standards, Oxygen organic compounds, Toxicology, Ecology, Manufacturing, Risk assessment, Requirements, Agricultural products, Data acquisition, Guidelines, Biological effects, Genetics, Forms(Paper), Labels, Rodenticides, Public health, *Reregistration, *Warfarin, Federal Insecticide Fungicide and Rodenticide Act, Coumarin/(acetonylbenzyl)-hydroxy, Coumarin/(acetonylbenzyl)-hydroxy-(sodium salt), CAS 81-81-2.

PB92-126754/REB PC **A02/MF A01**
RED Facts: Warfarin. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Jun 91, 7p EPA/540/FS-92/165
See also PB92-126747 and PB92-126739.

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

Keywords: *Pesticides, *Toxic substances, Information transfer, Hazardous materials, Chemical properties, Regulations, Toxicology, Ecology, Path of pollutants, Agricultural products, Rodenticides, Oxygen organic compounds, Labels, *Warfarin, *Chemical Information Fact Sheet, Use patterns, Science findings, Coumarin/(acetonylbenzyl)-hydroxy, Coumarin/(acetonylbenzyl)-hydroxy-(sodium-salt).

PB92-126762/REB PC **A07/MF A02**
Dry Cleaning Facilities: Background Information for Proposed Standards. Draft rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Nov 91, 143p EPA/450/3-91/020A
See also PB81-100497 and PB92-126770.

National emission standards for the control of hazardous air pollutant emissions from the dry cleaning industry are being proposed under the authority of Section 112 of the Clean Air Act, as amended. These standards apply to existing and new dry cleaning facilities, the construction or reconstruction of which began on or after the date of proposal. This document contains a summary of the technical information used to support development of the standards. This document also discusses the regulatory alternatives considered during development of the proposed standards and the environmental and cost impacts associated with each alternative. A detailed 'Economic Impact Analysis of Regulatory Controls in the Dry Cleaning Industry' is contained in (PB92-126770) dated October 1991.

Keywords: *Environmental impact statements-draft, *Dry cleaning, *Tetrachloroethylene, Air pollution control, Clean Air Act, Pollution regulations, Chlorine organic compounds, Cost analysis, Substitutes, Hazardous materials, Pollution sources, Organic solvents, Baseline measurements, Revisions, SIC 7218, SIC 7216, SIC 7215, Area sources, Ethane/trichloro.

PB92-126770/REB PC **A11/MF A03**
Economic Impact Analysis of Regulatory Controls in the Dry Cleaning Industry. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Oct 91, 234p EPA/450/3-91/021
See also PB92-126762.

Under authority of the 1990 Clean Air Act Amendments, a National Emission Standard for Hazardous Air Pollutants (NESHAP) is being proposed to control perchloroethylene emissions from dry cleaning facilities. Coin-operated (SIC 7215), commercial (SIC 7216), and industrial (SIC 7218) sectors of the dry cleaning industry were evaluated. The report analyzes three regulatory alternatives and five exemption levels considered for proposal using an integrated approach that examines both economic and financial impacts on dry cleaning facilities.

Keywords: *Dry cleaning, *Economic impact, *Air pollution economics, *Air pollution control, *Tetrachloroethylene, Pollution regulations, Clean Air Act, Air pollution standards, Hazardous materials, Financial management, Organic solvents, Chlorine organic compounds, Cost analysis, Substitutes, Marketing, Ethane/trichloro, SIC 7218, SIC 7216, SIC 7215.

PB92-126978/REB PC **A02/MF A01**
Pesticide Fact Sheet Number 228: Triflumizole.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
24 Oct 91, 9p EPA/540/FS-92/168

The document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued when the registration of a new chemical has taken place as in the case with Triflumizole.

Keywords: *Pesticides, *Toxic substances, Fungicides, Hazardous materials, Chemical properties, Regulations, Toxicology, Ecology, Path of pollutants, Nitrogen heterocyclic compounds, Imidazoles, Agricultural products, *Triflumizole, Terraguard, Imidazole/((chloro-(trifluoromethyl)phenyl)imino)-propoxyethyl, CAS 68694-11-1, Chemical information fact sheet, Use patterns, Science findings.

PB92-126986/REB PC **A03/MF A01**
Pesticide Fact Sheet Number 229: Diquat Dibromide.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Jun 87, 11p EPA/540/FS-92/169
See also PB87-105490.

The document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued when the issuance or reissuance of a registration standard has taken place. The Fact Sheet on Diquat Dibromide includes such a summary.

Keywords: *Pesticides, *Toxic substances, Herbicides, Bromine organic compounds, Hazardous materials, Chemical properties, Regulations, Toxicology, Ecology, Path of pollutants, Agricultural products, *Diquat dibromide, CAS 85-00-7, Deiquat, Pyrazinedium dibromide/dihydrodipyrido, Chemical information fact sheet, Use patterns, Science findings.

PB92-127968/REB PC **A99/MF E99**
Environmental Protection Agency, Washington, DC.
Application for Certification 1990 Model Year Light-Duty Vehicles - BMW.
BMW of North America, Inc., Montvale, NJ.
1992, 1996p EPA/460/A-90/33
See also PB91-242651. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1990 models), BMW of North America.

PB92-127976/REB PC **A22/MF A04**
Environmental Protection Agency, Washington, DC.
Application for Certification 1990 Model Year Light-Duty Vehicles - Honda.
American Honda Motor Co., Inc., Gardena, CA.
1992, 519p EPA/460/A-90/34
See also PB86-135837. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or exhaust and evaporative emission control systems. It also provides information on emission test procedures, service accu-

mulation 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, Evaporative emission control devices, Motor vehicles(1990 models), Honda.

PB92-127984/REB PC **A13**/MF **A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1990 Heavy-Duty Diesel - Detroit Diesel.
Detroit Diesel Corp., MI.
1992, 295p EPA/460/A-90/35
Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, *Heavy duty vehicles, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Motor vehicles(1990 models), Detroit Diesel Corporation.

PB92-127992/REB PC **A99**/MF **A06**
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Trucks - Chrysler Jeep.
Chrysler Corp., Detroit, MI.
1991, 666p EPA/460/A-91/15
See also PB90-214016. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), Chrysler Motor Corporation, Chrysler light duty trucks.

PB92-128008/REB PC **A99**/MF **E11**
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Trucks - Chrysler.
Chrysler Corp., Detroit, MI.
1992, 983p EPA/460/A-91/16
See also PB90-213992 and PB92-127992. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), Chrysler Motor Corporation, Chrysler light duty trucks.

PB92-128016/REB PC **A99**/MF **E11**
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Vehicles - Chrysler.
Chrysler Corp., Detroit, MI.
1992, 948p EPA/460/A-91/17
See also PB90-214008 and PB92-128008. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), Chrysler Motor Corporation.

PB92-128024/REB PC **A13**/MF **A03**
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Vehicles - Fiat.
Fiat Research and Development, Dearborn, MI. U.S.A. Branch.
1992, 292p EPA/460/A-91/18
See also PB91-242669. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), Fiat.

PB92-128032/REB PC **A99**/MF **E08**
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Vehicles - American Honda.
American Honda Motor Co., Inc., Gardena, CA.
1992, 772p EPA/460/A-91/19
See also PB86-135837 and PB92-127976. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), American Honda Motor Company, Incorporated.

PB92-128040/REB PC **A05**/MF **A01**
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Vehicles - Jaguar.
Jaguar Cars, Inc., Leonia, NJ.
1992, 85p EPA/460/A-91/20
See also PB87-141701. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), Jaguar Cars, Incorporated.

PB92-128057/REB PC **A99**/MF **E14**
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Vehicles - Mazda Motor Company.
Mazda Motor Corp., Hiroshima (Japan).
1992, 1338p EPA/460/A-91/21
See also PB90-214123. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), Mazda Motor Corporation.

PB92-128065/REB PC A99/MF E08
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Vehicles - Mercedes Benz.
Mercedes-Benz of North America, Inc., Montvale, NJ.
1992, 974p EPA/460/A-91/22
See also PB90-214131. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), Mercedes Benz of North America.

PB92-128073/REB PC A99/MF A06
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Trucks - Mitsubishi.
Mitsubishi Motors Corp., Tokyo (Japan).
1992, 705p EPA/460/A-91/23
See also PB90-214149. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), Mitsubishi Motors Corporation, Mitsubishi light duty trucks.

PB92-128081/REB PC A07/MF A02
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Vehicles - Range Rover.
Range Rover of North America, Inc., Lanham, MD.
1992, 129p EPA/460/A-91/24
Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), Range Rover of North America, Incorporated.

PB92-128099/REB PC A06/MF A02
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Vehicles - Sterling.
Sterling Motor Cars, Miami, FL.
1992, 102p EPA/460/A-91/25
Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), Sterling Motor Cars.

PB92-128107/REB PC A99/MF E19
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Light-Duty Vehicles - Volvo.
Volvo of America Corp., Rockleigh, NJ.
1992, 1915p EPA/460/A-91/26
See also PB90-214180. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, Evaporative emission control devices, Motor vehicles(1991 models), Volvo Cars of North America.

PB92-128115/REB PC A06/MF A02
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Heavy-Duty Gas - Chrysler.
Chrysler Corp., Detroit, MI.
1992, 123p EPA/460/A-91/27
See also PB90-214214. Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, *Heavy duty engines, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Motor vehicles(1991 models), Chrysler Motor Corporation.

PB92-128123/REB PC A10/MF A03
Environmental Protection Agency, Washington, DC.
Application for Certification 1991 Model Year Heavy-Duty Diesel Engines - Isuzu Motors.
Isuzu Technical Center of America, Novi, MI.
1992, 219p EPA/460/A-91/28
Sponsored by Environmental Protection Agency, Washington, DC.

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 engineering data include explanations and/or drawings which describe engine/vehicle parameters such as basic engine design, fuel systems, ignition systems or 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, *Heavy duty engines, *Emission control, *Certification, Air pollution control, Compliance, Exhaust emission control devices, Evaporative emission control devices, Motor vehicles(1991 models), Isuzu Technical Center of America.

PB92-128206/REB PC A06/MF A02
Environmental Protection Agency, Washington, DC.
Compilation of Current Practices at Land Disposal Facilities: Summary of Liner and Leak Detection Designs, Action Leakage Rates, Response Action Plans, and Management of Liquids in Landfills.
Summary rept.
PRC Environmental Management, Inc., McLean, VA.
Jan 92, 174p* EPA/530/R-92/003
Contract EPA-68-W9-0041
Sponsored by Environmental Protection Agency, Washington, DC.

The report summarizes the results of a nationwide evaluation of hazardous waste land disposal facility permits/Part B permit applications regarding liners, leak detection systems, and the treatment of liquids and use of absorbents at landfills. The findings of the report will support the development of final US EPA regulations in these areas.

Keywords: *Land disposal, *Waste management, *Liquid waste disposal, *Land pollution abatement, *Hazardous materials, *Earth fills, Pollution regulations, Surface impoundments, Questionnaires, Waste treatment, Leakage, Linings, Design criteria, Absorbents, Resource Conservation and Recovery Act, US EPA Regions 1-10.

PB92-128214/REB PC A04/MF A01
Action Leakage Rates for Leak Detection Systems. (Supplemental Background Document for the Final Double Liners and Leak Detection Systems Rule for Hazardous Waste Landfills, Waste Piles, and Surface Impoundments).
Environmental Protection Agency, Washington, DC. Office of Solid Waste.

Jan 92, 74p EPA/530/R-92/004
See also PB87-132825 and PB87-191383.

The document supplements the original background documents supporting the 1986 and 1987 proposals for double liners and leachate collection and removal systems, and liners and leak detection system rules for hazardous waste landfills, surface impoundments, and waste piles. A lot of information has been generated since the 1986 and 1987 proposals that further support this rulemaking. In particular, data on actual flow rates at double-lined landfills and surface impoundments and on top liner performance has been collected and evaluated, flow models have been applied to calculate action leakage rates, and a number of technical guidances have been published. The document discusses each of these.

Keywords: *Waste management, *Land pollution abatement, *Linings, *Hazardous materials, Waste disposal, Earth fills, Surface impoundments, Leak detectors, Pollution regulations, Performance evaluation, Leakage, Flow rate, Field tests, Computerized simulation, *Liner Leak Detection Rules, Waste piles.

PB92-129121/REB PC **A04/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Guides to Pollution Prevention: The Photoprocessing Industry.
Jacobs Engineering Group, Inc., Pasadena, CA.
Oct 91, 66p EPA/625/7-91/012
Contract EPA-68-D8-0112
See also PB92-129121 and PB91-228817. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Commercial photoprocessors generate a variety of waste streams during color and black and white film development and print making that present opportunities for waste reduction. The guide describes the typical processes found in photoprocessing operations, specifically those operations based on silver development chemistry, and provides waste reduction options for these operations. Both source reduction and recycling opportunities are identified. Suggestions are provided for regenerating and reusing developer, bleach, and fixative baths, as well as achieving reduction in rinse water flows. Technologies and techniques for recovering silver from both aqueous and solid waste streams are also discussed. To help companies in the industry identify opportunities for waste reduction at their own facilities, the guide includes a set of worksheets which take the user step-by-step through an analysis of the on-site waste generating operations and the possibilities for minimizing each waste. The guide and its worksheets would also be instructive to consultants serving the photoprocessing industry and government agencies who regulate waste streams generated from photoprocessing firms.

Keywords: *Pollution abatement, *Waste management, *Photographic processing chemicals, *Photographic processors, Guidelines, Waste recycling, Waste utilization, Materials recovery, Industrial wastes, Pollution regulations, Case studies, *Waste minimization, *Source reduction.

PB92-129139/REB PC **A04/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Guides to Pollution Prevention: The Automotive Refinishing Industry.
Jacobs Engineering Group, Inc., Pasadena, CA.
Oct 91, 54p EPA/625/7-91/016
Contract EPA-68-D8-0112
See also PB92-129121. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Automotive refinishing shops generate a variety of wastes while performing typical auto body repair and refinishing operations such as welding, filling dents, body section adjustments, alignments, sanding and painting. Opportunities for waste reduction exist for the waste thinners, solvents, and paints generated as well as the air emissions and waste water discharges. Both source reduction and recycling opportunities are identified. Suggestions include improved paint application technology and substitute paints; recovery and reuse of solvents and thinners; and implementing good materials management and housekeeping practices. To help companies in the industry identify opportunities for waste reduction at their own shops, the guide includes a set of worksheets which take the user step-by-step through an analysis of the on-site waste generating operations and the possibilities for minimizing each waste. The guide and its worksheets would also be instructive to consultants serving the automotive refinishing industry and government agencies who regulate waste streams generated from these firms.

Keywords: *Pollution abatement, *Waste management, *Repair shops, *Automobile bodies, *Finishing, Pollution sources, Guidelines, Waste recycling, Pollution regulations, Compliance, Hazardous materials spills, Industrial wastes, Coating processes, Air pollution abatement, Water pollution abatement, *Waste minimization, *Source reduction, Cleanup operations.

PB92-129592/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Estimating Natural Emissions for EPA's Regional Oxidant Model. Interim rept. Jun 91-Nov 91.
National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Air Resources Lab.
T. E. Pierce, and J. H. Novak. 1991, 14p EPA/600/D-91/286
See also PB91-119669 and PB91-171918. Presented at Environmental Protection Agency/Air and Waste Management Association International Specialty Conference on Emission Inventory Issues in the 1990's, Durham, NC., September 9-12, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

The paper documents the methodology used to estimate natural sources of nitrogen oxide (NOx) and nonmethane hydrocarbon (NMHC) emissions in the Regional Oxidant Model (ROM). The ROM is a three-dimensional photochemical grid model designed to simulate hourly concentrations of ozone and related chemical species. The current operational version of the model accepts anthropogenic and natural emissions on a grid cell resolution of 1/6 deg latitude by 1/4 deg longitude (approximately 18.5 km by 18.5 km). Sources that are simulated include NO emissions from lightning and soil microbial activity, and NMHC emissions from vegetation. Estimates made for the eastern United States indicate that biogenic NMHC emissions are larger than anthropogenic NMHC emissions. Natural sources of NO, however, are less than one-tenth the size of anthropogenic NOx emissions.

Keywords: *Natural emissions, *Air pollution sources, *Photochemical reactions, *Mathematical models, *Atmospheric chemistry, Study estimates, Three-dimensional calculations, Nitrogen oxides, Concentration(Composition), Non-methane hydrocarbons, Vegetation, Biomass, *Regional Oxidant Model, Eastern Region(United States).

PB92-129600/REB PC **A02/MF A01**
Evaluation of a Sampling and Analysis Method for Determination of Polyhalogenated Dibenzo-p-Dioxins and Dibenzofurans in Ambient Air.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
R. L. Harless, R. G. Lewis, D. D. McDaniel, J. F. Gibson, and A. E. Dupuy. 1991, 9p EPA/600/D-91/287
See also PB91-196063. Prepared in cooperation with National Aeronautics and Space Administration, Bay Saint Louis, MS. John C. Stennis Space Center.

General Metals Works PS-1 PUF air samplers and an analytical method based on high resolution gas chromatography - high resolution mass spectrometry (HRGC-HRMS) were evaluated for determination of polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDDs/PCDFs), polybrominated dibenzo-p-dioxins and dibenzofurans (PBDDs/PBDFs) and bromo/chloro dibenzo-p-dioxins and dibenzofurans (BCDDs/BCDFs) in ambient air. Dilute solutions of these compounds and (13)C12-1,2,3,4-TCDD were used to spike the filters of PS-1 air samplers which were then operated 24 hrs to sample 350-400 cu m ambient air. After sampling, each quartz-fiber filter and polyurethane foam (PUF) were spiked with (13)C12-labeled PCDD, PCDF, PBDD, and PBDF internal standards before separate Soxhlet extractions with benzene. The extracts were subjected to an acid/base clean-up procedure followed by clean-up on microcolumns of silica gel, alumina, and carbon and then analyzed by HRGC-HRMS. Results derived from the study indicated the PS-1 ambient air samplers and the analytical procedures were very efficient and that pg/cu m and sub-pg/cu m levels of total PCDDs/PCDFs, PBDDs/PBDFs, BCDDs/BCDFs, and 2,3,7,8-substituted congeners could be accurately measured. Background levels of these compounds in the ambient air were also determined. Total PCDDs, PCDFs, TBDFs, and PeBDFs were detected in a low concentration range of 0.3 to 3.0 pg/cu m.

Keywords: *Air pollution sampling, *Air pollution detection, *Gas analysis, *Furans, *Dioxins, *Metal industry, Chlorine organic compounds, Bromine organic compounds, Gas chromatography, Mass chromatography, Polychlorinated dibenzodioxins, Polychlorinated dibenzofurans, Isotopic labeling, Concentration(Composition), Polybrominated dibenzodioxins, Polybrominated dibenzofurans, Dibenzodioxin/chloro, Dibenzodioxin/bromo, Dibenzofuran/chloro, Dibenzofuran/bromo.

PB92-129618/REB PC **A02/MF A01**
Environmental Research Lab., Gulf Breeze, FL.
Specificity of Cellular DNA-Binding Sites of Microbial Populations in a Florida Reservoir. Journal article.
University of South Florida, St. Petersburg. Dept. of Marine Science.
J. H. Paul, and S. L. Pichard. c1989, 6p EPA/600/J-89/553
Pub. in Applied and Environmental Microbiology, v55 n11 p2798-2801 Nov 89. See also PB90-129495. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

Substrate specificity of the DNA binding mechanism(s) of bacteria in a Florida Reservoir was investigated in short and long term uptake studies with radiolabelled DNA and unlabelled competitors. Thymine oligonucleotides ranging in size from 2 bp to 19-24 bp inhibited DNA binding in 20 min incubations by 43 to 77%. Deoxynucleoside monophosphates, thymidine, and thymine had little effect on short term DNA binding, although several of these compounds inhibited the uptake of radiolabel from DNA in 4 h incubations. RNA inhibited both short and long term radiolabelled DNA uptake equally as well as unlabelled DNA. Collectively these results indicate that aquatic bacteria posses a generalized nucleic acid uptake/binding mechanism specific for compounds containing phosphodiester bonds and capable of recognizing oligonucleotides as short as dinucleotides.

Keywords: *Aquatic microbiology, *Deoxyribonucleic acids, *Cell membrane, *Reservoirs, Substrate specificity, Florida, Phosphates, Fresh water, Oligonucleotides, Thymidine, Thymine, Reprints.

PB92-129626/REB PC **A02/MF A01**
Environmental Research Lab., Gulf Breeze, FL.
Estimating the Rate of Plasmid Transfer: An End-Point Method. Journal article.
Massachusetts Univ., Amherst. Dept. of Zoology.
L. Simonsen, D. M. Gordon, F. M. Stewart, and B. R. Levin. c1990, 9p EPA/600/J-90/551
Pub. in Jnl. of General Microbiology, v136 p2319-2325 1990. See also PB91-163816. Prepared in cooperation with Brown Univ., Providence, RI. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

The document describes a method for determining the rate parameter of conjugative plasmid transfer that is based on single estimates of donor, recipient and transconjugant densities and the growth rate in exponential phase of the mating culture. The formula for estimating the plasmid transfer rate, gamma, was derived from a mathematical model describing cell growth and plasmid transfer in batch culture. Computer simulations were used to explore the sensitivity of the method to the realities of bacterial life, such as growth rate differences, plasmid segregation and transitory derepression of pilus synthesis. As predicted by the theory, mating experiments with the plasmid R1 in Escherichia coli K12 demonstrated that the estimate gamma is unaffected by cell density, donor: recipient ratio and mating time. Unlike previous techniques, the method allows investigations into the effect of environmental factors on plasmid transfer rates when these factors also influence population growth rates. To illustrate this, the authors examined the effect of temperature on the rate of plasmid transfer. (Copyright (c) 1990 SGM.)

Keywords: *Plasmids, Escherichia coli, Genetic conjugation, Kinetics, Computerized simulation, Growth, Reprints.

PB92-129634/REB PC A02/MF A01
Environmental Research Lab., Gulf Breeze, FL.
Cloning and Characterization of tfdS, the Repressor-Activator Gene of tfdB, from the 2,4-Dichlorophenoxyacetic Acid Catabolic Plasmid pJP4. Journal article.
Michigan Univ., Ann Arbor. Medical School.
B. Kaphammer, and R. H. Olsen. c1990, 10p EPA/600/J-90/552
Pub. in Jnl. of Bacteriology, v172 n10 p5856-5862 Oct 90. Sponsored by Environmental Research Lab., Gulf Breeze, FL.

Plasmid pRO101, a derivative of plasmid pJP4 which contains Tn1721 inserted into a nonessential region, is inducible for 2,4-dichlorophenol hydroxylase (DCPH) encoded by tfdB. Plasmid pRO103, which has a deletion in the BamHI-F-BamHI-E region of plasmid pRO101, has elevated basal levels of DCPH but is uninducible. The regulatory gene for tfdB, designated tfdS, was cloned as an 8.3-kilobase-pair EcoRI-E fragment. When the cloned tfdS gene was in trans with plasmid pRO103, the baseline DCPH levels were repressed to normal uninduced levels and were fully induced when this strain was grown in the presence of 2,4-dichlorophenoxyacetic acid, 2,4-dichlorophenol, or 4-chlorocatechol. However, when tfdS was in trans with tfdB in the absence of tfdCDEF, tfdB was repressed but could not be induced. When tfdS and tfdC1, which encodes chlorocatechol 1,2-dioxygenase, are in trans with tfdB, tfdB remained uninduced, indicating that a downstream metabolite of chloro-cis,cis-muconate, either 2-cis-chlorodiene lactone or chloromaleylacetic acid, is the effector. Collectively, these data demonstrate that the gene product of tfdS acts as a repressor of tfdB in the absence of an effector and as an activator of tfdB when an effector is present. (Copyright (c) 1990 American Society for Microbiology.)

Keywords: *Molecular cloning, *Plasmids, *Repressor proteins, *2-4-dichlorophenoxyacetic acid, Gene expression regulation, Pseudomonas aeruginosa, Restriction mapping, Regulator genes, Reprints, Chlorocatechols, Dichlorophenol hydroxylase, Dichlorophenol.

PB92-129642/REB PC A03/MF A01
Technical Basis for Establishing Sediment Quality Criteria for Nonionic Organic Chemicals Using Equilibrium Partitioning. Annual Review. Journal article.
Environmental Research Lab., Narragansett, RI.
D. M. DiToro, C. S. Zarba, D. J. Hansen, W. J. Berry, and R. C. Swartz. c1991, 45p EPA/600/J-91/327, ERLN-1126
Pub. in Environmental Toxicology and Chemistry, v10 p1541-1583 1991. See also PB83-189076. Prepared in cooperation with Manhattan Coll., Bronx, NY. Dept. of Environmental Engineering, Science Applications International Corp., Narragansett, RI., Battelle Pacific Northwest Labs., Richland, WA., and Ebasco Environmental, Bellevue, WA.

The purpose of the review paper is to present the technical basis for establishing sediment quality criteria using equilibrium partitioning (EqP). Equilibrium partitioning is chosen because it addresses the two principal technical issues that must be resolved: the varying bioavailability of chemicals in sediments and the choice of the appropriate biological effects concentration. The data that are used to examine the question of varying bioavailability across sediments are from toxicity and bioaccumulation experiments utilizing the same chemical and test organism but different sediments. It has been found that if the different sediments in each experiment are compared, there is essentially no relationship between sediment chemical concentrations on a dry weight basis and biological effects. However, if the chemical concentrations in the pore water of the sediment are used (for chemicals that are not highly hydrophobic) or if the sediment chemical concentrations on an organic carbon basis are used, then the biological effectsoccur at similar concentrations (withinq a factor of two) for the different sediments. In addition, the effects concentrations are the same as, or they can be predicted from, the effects concentration determined in water-only exposures. (Copyright (c) 1991 SETAC.)

Keywords: *Sediment water interfaces, *Biological effects, *Water pollution effects, *Organic compounds, *Environmental protection, Toxicity, Bioaccumulation, Aquatic biology, Concentration(Composition), Water pollution standards, Reviews, Water quality, Graphs(Charts), Freshwater, Saline water, Reprints, *Equilibrium partitioning, *Sediment quality criteria, Maximum Contaminant Level Goals.

PB92-129659/REB PC A03/MF A01
Biodegradation of Creosote and Pentachlorophenol in Contaminated Groundwater: Chemical and Biological Assessment. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
J. G. Mueller, D. P. Middaugh, S. E. Lantz, and P. J. Chapman. c1991, 11p EPA/600/J-91/328, CONTRIB-728
Pub. in Applied and Environmental Microbiology, v57 n5 p1277-1285 May 91. See also PB90-129552. Prepared in cooperation with Southern BioProducts, Inc., Pendleton, SC.

Shake flask studies examined the rate and extent of biodegradation of pentachlorophenol (PCP) and 42 components of coal-tar creosote present in contaminated groundwater recovered from the American Creosote Works Superfund site, Pensacola, Fla. The ability of indigenous soil microorganisms to remove these contaminants from aqueous solutions was determined by gas chromatographic analysis of organic extracts of biotreated groundwater. Changes in potential environmental and human health hazards associated with the biodegradation of the material were determined at intervals by Microtox assays and fish toxicity and teratogenicity tests. After 14 days of incubation at 30 C, indigenous microorganisms effectively removed 100, 99, 94, 88, and 87% of measured phenolic and lower-molecular-weight polycyclic aromatic hydrocarbons (PAHs) and S-heterocyclic, N-heterocyclic, and O-heterocyclic constituents of creosote, respectively. However, only 53% of the higher-molecular-weight PAHs were degraded; PCP was not removed. Despite the removal of a majority of the organic contaminants through biotreatment, only a slight decrease in the toxicity and teratogenicity of biotreated groundwater was observed. Data suggest that toxicity and teratogenicity are associated with compounds difficult to treat biologically and that one may not necessarily rely on indigenous microorganisms to effectively remove these compounds in a reasonable time span; to this end, alternative or supplemental approaches may be necessary. Similar measures of the toxicity and teratogenicity of treated material may offer a simple, yet important, guide to bioremediation effectiveness. (Copyright (c) 1991, American Society for Microbiology.)

Keywords: *Biodeterioration, *Water pollution control, *Biological treatment, *Hazardous materials, *Ground water, *Creosote, *Phenol/pentachloro, Waste disposal, Remedial action, Superfund, Chemical spills, Gas chromatography, Chemical analysis, Chemical reactions, Biological effects, Toxicity, Wood preservatives, Microorganisms, Biotechnology, Reprints.

PB92-129667/REB PC A03/MF A01
Acclimation of Aquatic Microbial Communities to Hg(II) and CH3Hg(+) in Polluted Freshwater Ponds. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
C. A. Liebert, T. Barkay, and R. R. Turner. c1991, 13p EPA/600/J-91/329
Pub. in Microbial Ecology, v21 p139-149 1991. See also PB89-237176. Prepared in cooperation with Oak Ridge National Lab., TN. Environmental Sciences Div., and Technical Resources, Inc., Gulf Breeze, FL.

The relationship of mercury resistance to the concentration and chemical speciation of mercurial compounds was evaluated for microbial communities of mercury-polluted and control waters. Methodologies based on the direct viable counting (DVC) method were developed to enumerate mercury-resistant communities. Elevated tolerance to Hg(II) was observed for the microbial community of one mercury polluted pond as compared to the community of control waters. These results suggest an in situ acclimation to Hg(II). The results of the methylmercury resistance-DVC assay suggested that minimal acclimation to CH3Hg(+) occurred since similar concentrations of CH3HgCl inhibited growth of 50% of organisms in both the control and polluted communities. Analyses of different mercury species in pond waters suggested that total mercury, but not CH3Hg(+) concentrations, approached toxic levels in the polluted ponds. Thus, microbial acclimation was specific to the chemical species of mercury that were present in the water at high enough concentration to cause toxic effects. (Copyright (c) Springer-Verlag New York Inc. 1991.)

Keywords: *Aquatic microbiology, *Water pollution effects, *Mercury(Metal), *Toxicity, Mercury organic compounds, Concentration(Composition), Ponds, Environmental effects, In-situ processing, Microorganisms, Toxic tolerances, Reprints, *Mercury/methyl.

PB92-129675/REB PC A03/MF A01
Department of Energy, Washington, DC.
Relationships of Hg(II) Volatilization from a Freshwater Pond to the Abundance of 'mer' Genes in the Gene Pool of the Indigenous Microbial Community. Journal article.
Environmental Research Lab., Narragansett, RI.
T. Barkay, R. R. Turner, A. VandenBrook, and C. Liebert. c1991, 13p EPA/600/J-91/330
Contract DE-AC05-84OR21400
Pub. in Microbial Ecology, v21 p151-161 1991. See also PB90-129529 and PB91-163782. Prepared in cooperation with Oak Ridge National Lab., TN. Environmental Sciences Div., and Technical Resources, Inc., Gulf Breeze, FL. Sponsored by Department of Energy, Washington, DC.

The role of biological activities in the reduction and volatilization of Hg(II) from a polluted pond was investigated. Elemental mercury was evolved from pond water immediately following spiking with (203) Hg(NO3)2, whereas an acclimation period of 36 hours was required in control samples collected from a nearby, unpolluted river before onset of volatilization. Genes encoding the bacterial mercuric reductase enzyme (mer genes) were abundant in DNA fractions extracted from biomass of the pond microbial community, but not in samples extracted from control communities. Thus, evolution of Hg(sup 0) was probably due to activities mediated by the bacterial mercuric reductase. Of four characterized mer operons, the system encoded by transposon 501 (mer(Tn501)) dominated and likely contributed to the majority of the observed Hg(II) volatilization. Thus, mer-mediated reduction and volatilization could be used to reduce Hg(II) concentrations in polluted waters, in turn decreasing rates of methylmercury formation by limiting substrate availability. (Copyright (c) Springer-Verlag New Yyork Inc. 1991.)

Keywords: *Mercury, *Aquatic microbiology, *Bacterial genes, *Fresh water, Volatilization, Chemical water pollutants, Autoradiography, Nucleic acid hybridization, DNA insertion elements, Reprints, Mercuric reductase.

PB92-129683/REB PC A02/MF A01
Bench-Scale Evaluation of Alternative Biological Treatment Processes for the Remediation of Pentachlorophenol- and Creosote-Contaminated Materials: Slurry-Phase Bioremediation. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
J. G. Mueller, S. E. Lantz, B. O. Blattmann, and P. J. Chapman. c1991, 9p EPA/600/J-91/331, CONTRIB-721
Pub. in Environmental Science and Technology, v25 n6 p1055-1061 1991. See also PB91-179085.

Performance data on slurry-phase bioremediation of pentachlorophenol (PCP)- and creosote-contaminated sediment and surface soil were generated at the bench-scale level. Aqueous slurries, containing 0.05% Triton X-100 to facilitate the soil washing process and to help stabilize the suspensions, were prepared from sediment and surface soil freshly obtained from the American Creosote Works Superfund site at Pensacola, Florida. Excluding PCP, benzo(b)fluoranthene, benzo(k)-fluoranthene and indeno(123-cd)pyrene, slurry-phase bioremediation of highly contaminated sediment (pH adjusted) resulted in rapid and extensive biodegradation (3-5 days to biodegrade > 50% of targeted compounds) of monitored constituents. Data suggest that slurry-phase bioremediation strategies can be effectively employed to remediate creosote-contaminated materials.

Keywords: *Biological treatment, *Remedial action, *Waste disposal, *Creosote, *Superfund, Soil treatment, Biotechnology, Sediments, Wood preservatives, Biodeterioration, Microbial degradation, Bench-scale experiments, Chlorine organic compounds, Aromatic polycyclic hydrocarbons, Reprints, *Phenol/pentach-

loro, Soil washing, Pensacola(Florida), Fluoranthene/benzo, Pyrene/indeno.

PB92-129691/REB PC **A01/MF A01**
Ovarian Mycosis in the Topsmelt 'Atherinops affinis'. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
J. T. Winstead, D. P. Middaugh, and L. A. Courtney.
c1991, 5p EPA/600/J-91/332, CONTRIB-702
Pub. in Diseases of Aquatic Organisms, v10 p221-223 1991. See also PB90-147745.

An ovarian mycosis in a topsmelt, Atherinops affinis (Ayres), collected from Elkhorn Slough, Monterey County, California, is reported. The fungus caused a considerable host response resulting in numerous granulomas, fibrosis and egg compression. Based on morphologic characteristics and the elimination of other fungal pathogens the fungus is probably a member of the class Oomyletes. This is the first report of an invasive ovarian mycosis in a marine fish.

Keywords: *Marine fishes, *Pathogenic fungi, *Pathogens, *Fish diseases, *Fish physiology, Exposure, Salinity, Spawning, Fish reproduction, Marine biology, Aquatic biology, Animal pathology, Fish parasites, Freshwater, Environmental effects, Reprints, *Atherinops affinis, *Ovarian mycosis.

PB92-129709/REB PC **A03/MF A01**
Changes in the Physiological Performance and Energy Metabolism of an Estuarine Mysid 'Mysidopsis bahia' Exposed in the Laboratory through a Complete Life Cycle to the Defoliant DEF. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
C. L. McKenney, T. L. Hamaker, and E. Matthews.
c1991, 15p EPA/600/J-91/333
Pub. in Aquatic Toxicology, v19 p123-135 1991. See also PB91-163949.

Measures of physiological performance and energy metabolism were made on an estuarine mysid (Mysidopsis bahia) exposed throughout a life cycle to the defoliant DEF. DEF concentrations > or = 0.246 microgram/l reduced survival through release of the first brood. Young production was completely arrested in DEF concentrations > or = 0.606 microgram/l, while concentrations > or = 0.085 microgram DEF/l reduced young production by the population. Concentrations > or = 0.140 microgram/l and > or = 0.085 microgram/l retarded growth rates in older juveniles and young adults, respectively, while stimulating respiration rates. Young mysids excreted less ammonia in DEF concentrations > or = 0.085 microgram/l. Higher O:N ratios during maturation of DEF-exposed mysids suggests greater reliance on energy-rich lipid substrates to support elevated metabolic demands, leaving reduced lipid for reproductive preparations.

Keywords: *Animal physiology, *Water pollution effects(Animals), *DEF-6 pesticide, *Defoliants, *Energy metabolism, *Zooplankton, *Life cycles, Phosphorotrithioic acid/(tributyl-ester), Phosphorus organic compounds, Toxic substances, Lipids, Marine biology, Estuarines, Oxygen, Nitrogen, Concentration(Composition), Exposure, Toxicity, Reprints, *Mysidopsis bahia.

PB92-129717/REB PC **A02/MF A01**
Performance Characterization of a Model Bioreactor for the Biodegradation of Trichloroethylene by 'Pseudomonas cepacia' G4. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
B. R. Folsom, and P. J. Chapman. c1991, 9p EPA/600/J-91/334, CONTRIB-714
Pub. in Applied and Environmental Microbiology, v57 n6 p1602-1608 Jun 91. See also PB90-264201. Prepared in cooperation with Technical Resources, Inc., Gulf Breeze, FL.

Of the volatile organic chemicals present in common groundwater contaminants, trichloroethylene (TCE) is the one most commonly found. TCE has been shown to be biodegraded by axenic cultures of aerobic organisms. Pseudomonas cepacia G4 grown in chemostats with phenol demonstrated constant specific degradation rates for both phenol and trichloroethylene (TCE) over a range of dilution rates. Washout of cells from chemostats was evident at a dilution rate of 0.2/h at 28C. Increased phenol concentrations in the nutrient feed led to increased biomass production with constant specific degradation rates for both phenol and TCE. The addition of lactate to the phenol feed led to increased biomass production but lowered specific phenol and TCE degradation rates. The maximum potential for TCE degradation was about 1.1 g per day per g of cell protein. Cell growth and degradation kinetic parameters were used in the design of a recirculating bioreactor for TCE degradation. In the reactor, the total amount of TCE degraded increased as either reaction time or biomass was increased. TCE degradation was observed up to 300 microM TCE with no significant decreases in rates. On the average, the reactor was able to degrade 0.7 g of TCE per day per g of cell protein. The results demonstrate the feasibility of TCE bioremediation through the use of bioreactors. (Copyright (c) 1991, American Society for Microbiology.)

Keywords: *Biodeterioration, *Ethylene/trichloro, *Phenol, *Water pollution control, *Bioreactors, Biochemistry, Volatile organic compounds, Reaction kinetics, Enzymes, Experimental design, Remedial action, Microbial degradation, Reprints, *Pseudomonas cepacia, Chemical reaction mechanisms.

PB92-129725/REB PC **A03/MF A01**
Bench-Scale Evaluation of Alternative Biological Treatment Processes for the Remediation of Pentachlorophenol- and Creosote-Contaminated Materials: Solid-Phase Bioremediation. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
J. G. Mueller, S. E. Lantz, B. O. Blattmann, and P. J. Chapman. c1991, 13p EPA/600/J-91/335, CONTRIB-722
Pub. in Environmental Science and Technology, v25 n6 p1045-1055 1991. See also PB89-109920 and PB88-174446.

Bench-scale biotreatability studies were performed to evaluate potential for a solid-phase bioremediation process to ameliorate pentachlorophenol (PCP)- and creosote-contaminated sediment and surface soil at the American Creosote Works Superfund site, Pensacola, Florida. Surface soil and sediment were contaminated with approximately 1 and 7% (weight basis) organic pollutants, respectively, but the more recalcitrant creosote constituents (i.e., high-molecular-weight polycyclic aromatic hydrocarbons) were proportionately higher in the surface soil indicative of creosote weathering. Data suggest that full-scale site remediation employing solid-phase bioremediation strategies may not effectively meet acceptable treatment standards in the time defining these studies.

Keywords: *Biological treatment, *Remedial action, *Creosote, *Waste management, *Phenol/pentachloro, *Superfund, Hazardous materials, Biotechnology, Sediments, Soil treatment, Biodeterioration, Microbial degradation, Wood preservatives, Soil management, Reprints, Pensacola(Florida), Cleanup operations.

PB92-129733/REB PC **A02/MF A01**
Detoxification of Pentachlorophenol and Creosote Contaminated Groundwater by Physical Extraction: Chemical and Biological Assessment. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
D. P. Middaugh, J. G. Mueller, R. L. Thomas, S. E. Lantz, and M. H. Hemmer. c1991, 9p EPA/600/J-91/336, CONTRIB-732
Pub. in Archives Environmental Contamination and Toxicology, v21 p233-244 1991. See also PB87-174934 and PB86-208543.

Chemical analyses revealed that polycyclic aromatic hydrocarbons (PAH's) and other organic compounds were present in a perennial freshwater stream that flowed through the abandoned American Creosote Works, designated for Superfund cleanup by the U.S. Environmental Protection Agency. A study was conducted to determine efficacy of ultrafiltration for removal of these organics from groundwater at the Superfund site. Ultrafiltration reduced the concentration of total identified organics from 210.0 mg/L in groundwater to 1.5 mg/L in the post-filtration permeate. Tests for toxicity/teratogenicity in embryonic inland silversides, Menidia beryllina; and Microtox were conducted with: streamwater, untreated groundwater, feedwater used in the ultrafiltration system and permeate water that passed through the ultrafiltration system. A concentration of 100% streamwater caused significant (alpha < or = 0.05) teratogenic responses in fish embryos and larvae. Groundwater and feedwater caused significant embryo toxic or teratogenic responses at concentrations of 100, 10 and 1%; Microtox EC50's were 0.85 and 0.48%, respectively. In contrast, only 100% permeate water caused significant increases in terata.

Keywords: *Water pollution control, *Creosote, *Ground water, *Phenol/pentachloro, *Water pollution effects, *Superfund, Waste disposal, Biological effects, Ultrafiltration, Toxicity, Aquatic animals, Streams, Environmental transport, Extraction, Reprints, Cleanup operations.

PB92-129741/REB PC **A02/MF A01**
Mutants of 'Pseudomonas cepacia' G4 Defective in Catabolism of Aromatic Compounds and Trichloroethylene. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
M. S. Shields, S. O. Montgomery, S. M. Cuskey, and P. J. Chapman. c1991, 9p EPA/600/J-91/337, CONTRIB-730
Pub. in Applied and Environmental Microbiology, v57 n7 p1935-1941 Jul 91. See also PB90-129537.

Pseudomonas cepacia G4 possesses a novel pathway of toluene catabolism that is shown to be responsible for the degradation of trichloroethylene (TCE). The pathway involves conversion of toluene via o-cresol to 3-methylcatechol. In order to determine the enzyme of toluene degradation that is responsible for TCE degradation, chemically induced mutants, blocked in the toluene ortho-monooxygenase (TOM) pathway of G4, were examined. Mutants of the phenotypic class designated TOM A(-) were all defective in their ability to oxidize toluene, o-cresol, m-cresol, and phenol, suggesting that a single enzyme is responsible for conversion of these compounds to their hydroxylated products (3-methylcatechol from toluene, o-cresol, and m-cresol and catechol from phenol) in the wild type. Mutants of this class did not degrade TCE. Two other mutant classes which were blocked in toluene catabolism, TOM B(-), which lacked catechol-2,3-dioxygenase, and TOM C(-) which lacked 2-hydroxy-6-oxoheptadienoic acid hydrolase activity, were fully capable of TCE degradation. Therefore, TCE degradation is directly associated with the monooxygenation capability responsible for toluene, cresol, and phenol hydroxylation. (Copyright (c) 1991, American Society for Microbiology.)

Keywords: *Mutations, *Toluene, *Trichloroethylene, *Aromatic compounds, Metabolism, Catalysis, Mutagenesis, Gas chromatography, Phenotype, Hydroxylation, Oxidation, Biodeterioration, Reprints, *Pseudomonas cepacia.

PB92-129758/REB PC **A02/MF A01**
Responses of Wetland Plants to Effluents in Water and Sediment. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
G. E. Walsh, D. E. Weber, M. T. Nguyen, and L. K. Esry. c1991, 10p EPA/600/J-91/338
Pub. in Environmental and Experimental Botany, v31 n3 p351-358 1991. See also PB91-200337.

Responses of two wetland vascular plants, Echinochloa crusgalli and Sesbania macrocarpa, exposed to effluents from a coke plant, a pulp mill, a wastewater treatment plant, and the herbicide, hexazinone, were measured in three types of tests: seed germination and early growth, seedling survival and growth in hydroponic culture, and seedling survival and growth in sand and synthetic sediments with clay, silt, and sand, 3, 5, 7.5, or 10% organic contents. There was no effect of effluents or herbicide on germination and survival was affected only by the herbicide. When compared to controls, growth rates were reduced significantly in all tests except for E. crusgalli exposed to effluent from a wastewater treatment plant. There, the effluent stimulated growth in sediments. Increasing concentrations of organic matter in sediments had little effect on toxicity of effluents, but did cause reduced effects of hexazinone.

Keywords: *Water pollution effects(Plants), *Aquatic plants, *Sediments, *Toxicity, *Effluents, *Wetlands, Industrial wastes, Organic matter, Plant growth, Germination, Plant physiology, Paper industry, Coking, Herbicides, Sewage treatment plants, Seeds, Reprints, Echinochloa crusgalli, Sesbania macrocarpa, Hexazinone.

PB92-129766/REB PC A03/MF A01
Heterotrophic Bacteria of the Freshwater Neuston and Their Ability to Act as Plasmid Recipients under Nutrient Deprived Conditions. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
G. W. Jones, L. Baines, and F. J. Genthner. c1991, 13p EPA/600/J-91/339
Pub. in Applied and Environmental Microbiology, v22 p15-25 1991. See also PB88-199476. Prepared in cooperation with Michigan Univ., Ann Arbor.

In a model system composed of a synthetic lake water, plasmid R68.45 was shown to transfer between P. aeruginosa strains at frequencies between 10 to the minus third power and 10 to the minus fifth power. Transconjugants were detected about 100 times more frequently at the neuston than in the bulk water, which reflected a greater enrichment of the donor at this site. None of the aquatic isolates were able to act as recipients of plasmid R68.45 in the model system with PAO4032 as donor. The results suggest that the spread of R68.45 or similar plasmids into this particular aquatic population through lateral transfer under nutrient deprived conditions would be a rare event. This does not, however, exclude the possibility that less copiotrophic aquatic forms may be more effective recipients under these conditions or that once established, R68.45, and other similar plasmids might proliferate through the neuston.

Keywords: *Pseudomonas aeruginosa, *Aquatic microbiology, *Plasmids, *Nutrients, Lakes, Genetic conjugation, Antibiotics, Metals, Reprints, *Freshwater neustons.

PB92-129774/REB PC A03/MF A01
Fate of 'Bacillus sphaericus' 2362 Spores Following Ingestion by Nontarget Invertebrates. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
A. A. Yousten, E. F. Benfield, R. P. Campbell, S. S. Foss, and F. J. Genthner. c1991, 11p EPA/600/J-91/340
Pub. in Jnl. of Invertebrate Pathology, v58 p427-435 1991. See also PB89-231526. Prepared in cooperation with Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Biology.

Elimination of Bacillus sphaericus spores ingested by midge larvae, snails, and oysters was most rapid among midge larvae. Spores remained in oysters up to 21 days and in snails up to 49 days. Viable spores were recovered in snail and oyster feces for these same periods. There was no indication of actively growing B. sphaericus in the animals. Passage through oyster gut detoxified the B. sphaericus mosquito larval toxin, but there was a 33% retention of toxicity following snail gut passage. Midge larvae reared to adults in spore-containing water carried spores in/on the adult body. This suggests that these animals could carry the bacteria to sites beyond the application area. (Copyright (c) 1991 by Academic Press, Inc.)

Keywords: *Bacillus, *Bacterial spores, *Invertebrates, *Biological pest control, Larva, Feces, Histology, Snails, Diptera, Oysters, Reprints, *Nontarget species.

PB92-129782/REB PC A02/MF A01
Carcinoma of the Exocrine Pancreas in Medaka. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
J. W. Fournie, W. E. Hawkins, M. S. J. Battalora, and W. W. Walker. c1991, 10p EPA/600/J-91/341
Pub. in Jnl. of Aquatic Animal Health, v3 p213-220 1991. See also PB88-196266. Prepared in cooperation with Gulf Coast Research Lab., Ocean Springs, MS.

Eight cases of acinar cell carcinoma of the exocrine pancreas were diagnosed in Japanese medaka (Oryzias latipes) from a pool of approximately 10,000 specimens used in a variety of carcinogenesis bioassays. Three cases occurred in specimens from control groups and one case in a specimen exposed to benzo(e)pyrene (BeP), a noncarcinogenic isomer of benzo(a)pyrene (BaP). Four cases occurred in specimens exposed to known carcinogens including two cases in specimens exposed to 7,12-dimethylbenz(a)anthracene (DMBA), one in a medaka exposed to benzo(a)pyrene, and one in a specimen exposed to methylazoxymethanol acetate (MAM-Ac). Pancreatic carcinoma was probably the cause of death in five cases. The neoplasms appeared to originate in the mesentery near the abdominal surface of the liver.

Keywords: *Water pollution effects(Animals), *Carcinogens, *Oryzias, *Pancreatic neoplasms, Benzopyrenes, Methylazoxymethanol acetate, Carcinogenicity tests, Histology, Peritoneal neoplasms, Reprints, Dimethylbenzanthracenes.

PB92-129790/REB PC A02/MF A01
Induction of Cytochrome P-450-IA1 in Juvenile Fish by Creosote-Contaminated Sediment. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
W. P. Schoor, D. E. Williams, and N. Takahashi. c1991, 10p EPA/600/J-91/342
Pub. in Archives of Environmental Contamination and Toxicology, v20 p497-504 1991. See also PB88-251699. Prepared in cooperation with Oregon State Univ., Corvallis. Dept. of Food Science and Technology.

Intact sediment cores, including their surface layers, were used in simulated field exposure tests of juvenile guppies (Poecilia reticulata) to creosote-contaminated sediments. Mixed-function oxygenase activity was induced in the fish after 43 days of exposure to environmentally realistic, sublethal concentrations of creosote-related compounds. An average 50-fold induction in the cytochrome P-450-IA1 was found in the liver in the absence of any histopathological lesions. The possibility that a threshold level for proliferative liver changes was not reached is discussed in the light of the observed biochemical activation.

Keywords: *Water pollution effects(Animals), *Cytochrome P-450, *Sediments, *Poecilia, *Creosote, Liver, Pathology, Mixed function oxidases, Enzyme induction, Immunohistochemistry, Liquid chromatography, Carcinogens, Reprints.

PB92-129808/REB PC A03/MF A01
Copper Toxicity to Sperm, Embryos and Larvae of Topsmelt 'Atherinops affinis', with Notes on Induced Spawning. Journal article.
Environmental Research Lab., Gulf Breeze, FL.
B. S. Anderson, D. P. Middaugh, J. W. Hunt, and S. L. Turpen. c1991, 21p EPA/600/J-91/343
Pub. in Marine Environmental Research, v31 p17-35 1991. See also PB85-227023. Prepared in cooperation with California Univ., Santa Cruz, and California State Dept. of Fish and Game, Monterey. Marine Pollution Studies Lab.

Topsmelt, Atherinops affinis, were induced to spawn repeatedly in the laboratory using a combination of environmental cues. Temperature spikes appeared to be the most important factor to induce spawning. Egg production peaked four days after a 2C increase in water temperature, and declined thereafter. A series of static toxicity tests compared the relative sensitivity of topsmelt sperm, embryos, and larvae to copper chloride. Of the three developmental stages compared, sperm were more sensitive than embryos, and embryos were more sensitive than larvae. The mean EC50 from four separate 48-h fertilization experiments was 109 micrograms copper/liter. The mean EC50 from three, 12-day embryo development development tests was 142-147 micrograms copper/liter, depending on the endpoint used. The mean LC50 from three, 96-h larval mortality tests was 238 micrograms copper/liter. Topsmelt are amenable to laboratory culture and are a promising eastern Pacific toxicity test species. (Copyright (c) 1991 Elsevier Science Publishers Ltd, England.)

Keywords: *Water pollution effects(Animals), *Copper, *Toxicity, *Marine fishes, *Spermatozoa, Ovum, Reproduction(Biology), Fertilization, Reprints, Topsmelt, Atherinops affinis.

PB92-132778/REB PC A06/MF A02
Environmental Protection Agency, Seattle, WA. Region X.
Chemical Contamination of Harbor Seal Pups in Puget Sound. Puget Sound Estuary Program.
PTI Environmental Services, Bellevue, WA.
J. Calambokidis, G. H. Steiger, L. J. Lowenstine, and D. S. Becker. Sep 91, 120p EPA/910/9-91/032
Contract EPA-68-D8-0085
See also PB84-223601 and PB91-172734. Sponsored by Environmental Protection Agency, Seattle, WA. Region X.

Dead newborn harbor seals were collected from Smith Island in the Strait of Juan de Fuca and from Gertrude Island in southern Puget Sound. A variety of chemical contaminants were measured in different kinds of tissue from seven harbor seal pups from each location. In addition to measurements of chemical concentrations, various tissues were also evaluated microscopically for histopathological abnormalities. Finally, two methods for determining the concentrations of PCBs and DDE in blubber tissues were compared. Concentrations of PCBs, lead and silver were significantly higher in the seals from Gertrude Island than those from Smith Island. However, the concentrations of PCBs in seal pups from both locations have declined significantly since testing began in 1972.

Keywords: *Water pollution detection, *Water pollution effects(Animals), *Seals(Mammals), *Chemical analysis, *Bioassay, Marine animals, Puget Sound, Tissue culture, Concentration(Composition), Polychlorinated biphenyls, DDE insecticide, Chlorine organic compounds, Lead(Metals), Pathology, Data processing, *Puget Sound Estuary Program, EPA region 10.

PB92-132786/REB PC A05/MF A01
Environmental Protection Agency, Seattle, WA. Region X.
Dioxin and Furan Concentrations in Puget Sound Crabs. Puget Sound Estuary Program.
PTI Environmental Services, Bellevue, WA.
Sep 91, 89p EPA/910/9-91/040
Contract EPA-68-D8-0085
See also PB91-168369 and PB91-172833. Sponsored by Environmental Protection Agency, Seattle, WA. Region X.

Dioxin and furan concentrations were measured in crabs collected from eleven areas of potential chemical contamination and one reference area in Puget Sound in the spring of 1991. While recreationally harvestable Dungeness crabs were the target species, red rock and graceful crabs were also analyzed because they were the only species which could be collected in some areas. Both crab muscle and hepatopancreatic tissues were analyzed for the presence of dioxins and furans. The results of these analyses were evaluated using EPA's human health risk assessment guidance. While dioxins and furans were present in low concentrations in all samples, it appears that only the very heavy consumer of crab muscle and hepatopancreas would see a very sizeable increase in the risk of developing cancer from these chemicals.

Keywords: *Bioassay, *Water pollution detection, *Crabs, *Public health, *Dioxins, *Furans, *Chemical analysis, Concentration(Composition), Chlorine organic compounds, Aquatic ecosystems, Food webs, Tissue culture, Environmental surveys, Puget Sound, Risk assessment, Toxicity, Exposure, Sample preparation, Malignant neoplasms, Polychlorinated dibenzodioxins, Polychlorinated dibenzofurans, *Puget Sound Estuary Program, EPA region 10.

PB92-132794/REB PC A08/MF A02
Environmental Protection Agency, Seattle, WA. Region X.
Project Manager's Guide to Requesting and Evaluating Chemical Analyses. Puget Sound Estuary Program.
PTI Environmental Services, Bellevue, WA.
Aug 91, 159p EPA/910/9-90/024
Contract EPA-68-D8-0085
See also PB85-233542, PB86-137304, PB91-133249 and PB91-168369. Sponsored by Environmental Protection Agency, Seattle, WA. Region X.

The purpose of the manual is to help less-experienced project managers from government agencies, industry, and environmental groups request appropriate chemical analyses and make an informed evaluation of the analytical results. The manual, written for the nonchemist, walks the reader through defining analytical objectives, planning for and ensuring quality assurance, working with an analytical laboratory and evaluating the data received from the lab. The report appendices include, among other things, example Statements of Work for laboratories and an example Quality Assurance report.

Keywords: *Chemical analysis, *Environmental surveys, *Environment management, Management training, Guidelines, Water analysis, Gas analysis, Soil analysis, Sample preparation, Quality control, Data

processing, Bioassay, Quality assurance, Sediments, Hazardous materials, Waste management, Laboratories, Requirements, *Puget Sound Estuary Program.

PB92-132802/REB PC **A02**/MF **A01**
Land Manager's Guide to Water Quality Monitoring.
Environmental Protection Agency, Seattle, WA. Region X.
Nov 91, 9p EPA/910/9-91/039
See also PB92-104520.

The guide is designed to introduce the land manager to water quality monitoring and to illustrate how monitoring results can be used to improve management decisions and practices. In a reader friendly format, the guide: (1) defines water quality monitoring, (2) identifies some of the benefits obtainable from monitoring and evaluation, and (3) outlines the monitoring process from plan conception through use of the final report. The guide promotes participation of the land manager in all steps of the monitoring process, and emphasizes the need to use the feedback loop process to follow-up on monitoring results. This is a companion document to the Environmental Protection Agency's publication entitled 'Monitoring Guidelines to Evaluate Effects of Forestry Activities on Streams in the Pacific Northwest and Alaska' (EPA/910/9-91-001). The latter provides guidance for developing and implementing monitoring projects to the land manager's technical staff.

Keywords: *Water quality management, *Land management, *Water pollution sampling, *Guidelines, Environmental monitoring, Management planning, Data processing, Information transfer, Best technology.

PB92-132810/REB PC **A12**/MF **A03**
EPA Journal Holdings Report, 1991.
Environmental Protection Agency, Washington, DC. Information Management and Services Div.
Oct 91, 267p* EPA/IMSD-91/010
See also report for 1990, PB91-131318.

The purpose of the report is to improve access to journal articles and to encourage resource sharing. The approximately 3,600 titles and 12,000 holdings represent a wealth of data available from the libraries at EPA Headquarters, Regions and Laboratories. All EPA network libraries reported their journal holdings for inclusion in the report. The journals are listed alphabetically by title. After each title the libraries that own the journal are listed alphabetically by their OCLC code, showing their holdings. A list of EPA libraries appears on the first few pages, followed by a sample entry with explanatory notes.

Keywords: *Periodicals, *Bibliographies, *US EPA, *Pollution, Listings, Environmental surveys, Environmental health, Information transfer, Natural resources, Library collections.

PB92-132828/REB PC **A07**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Alternative Control Techniques Document: Nitric and Adipic Acid Manufacturing Plants.
Midwest Research Inst., Cary, NC.
D. W. Lazzo. Dec 91, 126p EPA/450/3-91/026
Contract EPA-68-02-4379
See also PB83-118330, PB84-185206 and PB86-144045. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The Alternative Control Techniques document describes available control techniques for reducing NOx emission levels from nitric and adipic acid manufacturing plants. The document contains information on the formation of NOx and uncontrolled NOx emissions from nitric and adipic acid plants. The following NOx control techniques for nitric acid plants are discussed: extended absorption, nonselective catalytic reduction (NSCR), and selective catalytic reduction (SCR). The following NOx control techniques for adipic acid plants are discussed: extended absorption and thermal reduction. For each control technique, achievable controlled NOx emission levels, capital and annual costs, cost effectiveness, and environmental and energy impacts are presented.

Keywords: *Air pollution control, *Chemical industry, *Nitrogen oxides, Nitric acid, Adipic acid, Absorption, Catalysis, Cost analysis, Selective catalytic reduction, Substitutes, Environmental effects, Energy consumption, Thermal utilization, Emission factors, Performance evaluation, Nonselective catalytic reduction.

PB92-132836/REB PC **A07**/MF **A02**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Guidelines for Asbestos NESHAP Demolition and Renovation Inspection Procedures.
Alliance Technologies Corp., Lowell, MA.
S. G. Piper, and N. Lebedzinski. Nov 90, 144p EPA/340/1-90/007
Contract EPA-68-02-4465
See also PB-258 813, PB87-175568 and PB87-119053. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The document provides EPA guidance on procedures for conducting regulatory compliance inspections at asbestos demolition and renovation worksites and waste disposal facilities. Detailed information concerning the following is included: (1) identification of asbestos-containing materials, (2) safety procedures, (3) pre-inspection activities, (4) facility inspection procedures, (5) post-inspection activities, (6) landfill inspections and (7) bulk sampling and analysis. Inspection checklists designed for facility inspection and landfill inspections are appended. The material presented is a summary of information and experience gained by EPA through the inspection and case development experiences of a nationwide representation of regulatory staff responsible for enforcing the asbestos NESHAP.

Keywords: *Asbestos, *Pollution regulations, *Waste management, *Inspection, *Air pollution standards, Guidelines, Waste disposal, Earth fills, Materials handling, Standards compliance, Protective equipment, Remedial action, Procedures, Law enforcement, Clean Air Act, Air pollution sampling, Air pollution detection, Field tests, Permits, *Natural Emission Standard for Hazardous Air Pollutants.

PB92-132844/REB PC **A10**/MF **A03**
Technical Guidance: State II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities. Volume 1. Chapters. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Nov 91, 217p EPA/450/3-91/022A
See also PB-267 613 and Volume 2, PB92-132851.

The Clean Air Act Amendments (CAAA) of 1990 require the installation of Stage II vapor recovery systems in many ozone nonattainment areas and direct EPA to issue guidance as appropriate on the effectiveness of Stage II systems. The document provides guidance on the effectiveness of Stage II systems and other Stage II technical information on emissions, controls, costs, and program implementation. Stage II vapor recovery on vehicle refueling is an effective control technology to reduce gasoline vapor emissions that contain volatile organic compounds (VOC) and hazardous air pollutants. Vehicle refueling emissions consist of the gasoline vapors displaced from the automobile tank by dispensed liquid gasoline. The Stage II system collects these vapors at the vehicle fillpipe and returns them to the underground storage tank.

Keywords: *Air pollution control, *Refueling, *Volatile organic compounds, Guidelines, Service stations, Performance evaluation, Underground storage, Storage tanks, Implementation, Cost analysis, Gasoline, Clean Air Act, Emission factors, *Vapor recovery systems.

PB92-132851/REB PC **A20**/MF **A04**
Technical Guidance: Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities. Volume 2. Appendices. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Nov 91, 474p EPA/450/3-91/022B
See also Volume 1, PB92-132844.

The Clean Air Act Amendments (CAAA) of 1990 require the installation of Stage II vapor recovery systems in many ozone nonattainment areas and direct EPA to issue guidance as appropriate on the effectiveness of Stage II systems. The document provides guidance on the effectiveness of Stage II systems and other Stage II technical information on emissions, controls, costs, and program implementation. Stage II vapor recovery on vehicle refueling is an effective control technology to reduce gasoline vapor emissions that contain volatile organic compounds (VOC) and hazardous air pollutants. Vehicle refueling emissions consist of the gasoline vapors displaced from the automobile tank by dispensed liquid gasoline. The Stage II system collects these vapors at the vehicle fillpipe and returns them to the underground storage tank.

Keywords: *Air pollution control, *Refueling, *Service stations, *Storage tanks, *Motor vehicles, Guidelines, Underground storage, Gasoline, Performance evaluation, Volatile organic compounds, Pollution sources, Cost analysis, Implementation, *Vapor recovery systems.

PB92-132869/REB PC **A07**/MF **A02**
Documentation of AIRS AMS National Methodologies. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
E. S. Kimbrough. Jan 92, 147p EPA/600/R-92/001
See also PB89-151427 and PB91-228759.

The report provides an understanding of the estimation procedures that will be used by the national component of the Area and Mobile Source Subsystem (AMS) to generate emissions estimates for area and mobile source categories. General methodology and assumptions are discussed as well as the original source of algorithms, activity levels, and emission factors necessary to calculate emissions for each area and mobile source in AMS. The report presents methodologies for all identified sources not defined as point sources. Area and mobile sources are divided into seven major groups: stationary source fuel combustion, mobile sources, industrial processes, solvent utilization, solid waste disposal, natural sources, and miscellaneous area sources. Historically, these methodologies have been referred to as the National Emissions Data System (NEDS) methods and to some extent were described in area source documentation for the 1985 National Acid Precipitation Assessment Program (NAPAP) inventory; however, the NAPAP documentation did not include certain initial data calculations. These initial data calculations and source data changes are included in the report.

Keywords: *Air pollution, *Emission factors, *Pollution sources, Stationary sources, Motor vehicles, Algorithms, Industrial plants, Combustion, Organic solvents, Waste disposal, Area and Mobile Source Subsystem.

PB92-132877/REB PC **A05**/MF **A01**
Selection of Adduct-Forming Chemicals for Human Monitoring Studies.
Environmental Monitoring Systems Lab., Las Vegas, NV.
Jul 91, 84p EPA/600/8-91/045
See also PB90-151762.

The U.S. EPA, through its Environmental Monitoring Systems Laboratory-Las Vegas (EMSL-LV) and its Health Effects Research Laboratory-Research Triangle Park (HERL-RTP) has been exploring the feasibility of using biological markers to monitor exposure to environmental chemicals. The participants began by compiling a list of chemicals of known or suspected health hazards and for which the potential for human exposure exists. The chemicals on the master list were then systematically evaluated for: (1) the potential for adduct-formation in vivo, (2) the availability of supportive adduct research data, (3) the identifiability of exposed population(s), and (4) the level of genetic activity. After considering all the relevant data, the participants selected and prioritized for further study a small group of chemicals considered to have the greatest potential for use in pilot, adduct-based, biological monitoring studies in human populations.

Keywords: *DNA adducts, *Toxicity, *Environmental pollutants, *Carcinogens, Exposure, Biological markers, Tables(Data), Environmental exposure pathways.

PB92-132885/REB PC **A06/MF A02**
Role of Climate in Forest Monitoring and Assessment: A New England Example.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
E. J. Cooter, S. K. LeDuc, L. Truppi, and D. R. Block.
Nov 91, 121p EPA/600/3-91/074
See also PB89-151526.

The development of climatological information products to support ecological data collection and analysis is described. The scope of research is narrowed to issues of direct interest to the joint U.S. Environmental Protection Agency Environmental Monitoring and Assessment Program and U.S. Department of Agriculture Forest Service New England Forest Health Monitoring program. Characteristics of climatological persistence and recurrence that are especially critical to New England forest health and productivity are identified. These include physical disturbance events (tornadoes, high winds and wet snowfall), drought, growing degree days and late spring freezes. Climatological data are assembled and presentations developed based on the analysis issue to be addressed: background (status and persistence); most recent decade (short-term trends, modeling and prediction); and near-term impacts (most recent sampling year). A Geographic Information System is used for presentation, data management and analysis. Major research findings focus on the application of climate data and products to operational ecological monitoring and analysis situations. Possible future activities are identified in the areas of new climatologies, program design, database acquisition or development and applied research. All these efforts would result in significant contributions to the development of a more coherent theory of natural disturbance and ecosystem response.

Keywords: *Climatology, *Forests, *Environmental monitoring, *Ecosystems, New England, Weather, Environmental effects, Maps, Seasonal variations, Annual variations, Geographic information systems, Case studies.

PB92-132893/REB PC **A03/MF A01**
Practical Directory to Phycovirus Literature.
Environmental Monitoring Systems Lab., Cincinnati, OH. Virology Branch.
R. S. Safferman, and M. E. Morris. Dec 91, 33p EPA/600/4-91/023
See also PB-267 550 and PB-297 718.

A directory to phycovirus literature was compiled to create an accounting of phycovirus knowledge to fulfill the needs not only of those who require a general overview of the subject, but also of those who require a comprehensive practical reference source for their studies. The 1991 edition retains the organization and scope of preceding editions. Besides the section on citations pertaining to viruses of procaryotic algae, there is a separate section that lists citations related to viruses of eucaryotic algae, which has grown considerably since the 1979 edition.

Keywords: *Plant viruses, *Bibliographies, *Plants(Botany), Algae, Bacteriophages, Cyanobacteria, *Phycoviruses.

PB92-132901/REB PC **A06/MF A02**
Environmental Monitoring Systems Lab., Cincinnati, OH.
Numerical Calculation: Aspiration Efficiency of Aerosols into Thin-Walled Sampling Inlets.
North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering.
K. M. Boyle, T. Kim, M. R. Flynn, and R. W. Wiener.
Nov 91, 107p EPA/600/3-91/075
Grant EPA-R-815152
See also AD-A239 231. Sponsored by Environmental Monitoring Systems Lab., Cincinnati, OH.

Aspiration efficiency of particles from a flowing airstream into a thin-walled sampling inlet is accurately predicted using a numerical model. The model combines the Boundary Integral Equation Method for predicting the velocity field into the inlet with an analytical solution to the particle equations of motion. A two- and a three-dimensional model are examined. Results for the three-dimensional model correlate well with an empirical model of aspiration efficiency. The method can be generalized to a wide range of airstream, sampling inlet, and particle conditions.

Keywords: *Aerosols, *Sampling, *Efficiency, *Inlets, Boundary value problems, Air pollution, Particulates, Computer programs, Mathematical models, Particle trajectories, Particles, Equations of motion, Air flow.

PB92-135417/REB PC **A03/MF A01**
Drinking Water Health Advisory for Aldrin.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Cantilli. Apr 91, 27p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water, has issued its report on the insecticide Aldrin. It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Aldrin, *Potable water, *Water pollution effects(Humans), *Toxicology, *Water quality, Chlorine organic compounds, Insecticides, Environmental effects, Pharmacokinetics, Health hazards, Chemical analysis, Water pollution effects(Animals), Metabolism, Laboratory animals, Public health, Ingestion(Biology), Carcinogenicity tests, Mutagenicity tests, Teratogens, CAS 309-00-2.

PB92-135425/REB PC **A03/MF A01**
Drinking Water Health Advisory for Ammonia.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Gantilli. Apr 91, 14p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water has issued its report on the compound ammonia. It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Potable water, *Water quality, *Water pollution effects(Humans), *Toxicology, *Ammonia, Environmental effects, Pharmacokinetics, Health hazards, Metabolism, Public health, Ingestion(Biology), Carcinogenicity tests, Mutagenicity tests, Teratogens, Water pollution effects(Animals), Chemical analysis, Laboratory animals.

PB92-135433/REB PC **A03/MF A01**
Drinking Water Health Advisory Antimony.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Cantilli. Apr 91, 25p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water has issued its report on the metal antimony: included are the compounds potassium antimony tartrate, sodium antimony tartrate, and sodium antimony bis(pyrocatechol)-disulfate. It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Potable water, *Water quality, *Water pollution effects(Humans), *Toxicology, *Antimony, *Antimony compounds, Alloys, Environmental effects, Pharmacokinetics, Health hazards, Water pollution effects(Animals), Metabolism, Public health, Ingestion(Biology), Carcinogenicity tests, Mutagenicity tests, Teratogens, Chemical analysis, Potassium antimony tartrate, Sodium antimony tartrate, Sodium antimony bis(pyrocatechol)-disulfate, CAS 7440-36-0, CAS 2800-74-5.

PB92-135441/REB PC **A03/MF A01**
Drinking Water Health Advisory for Beryllium.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Cantilli. Apr 91, 25p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water, has issued its report on beryllium: included are the compounds beryllium carbonate, beryllium phosphate, berylliumchloride, beryllium oxide, and beryllium sulfate. It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Potable water, *Water quality, *Water pollution effects(Humans), *Toxicology, *Beryllium, *Beryllium compounds, Beryllium sulfates, Environmental effects, Pharmacokinetics, Health hazards, Water pollution effects(Animals), Beryllium oxides, Beryllium carbonates, Beryllium chlorides, Metabolism, Public health, Ingestion(Biology), Carcinogenicity tests, Mutagenicity tests, Teratogens, Chemical analysis, Beryllium phosphates, CAS 7440-41-7, CAS 7787-47-5, CAS 13510-49-1, CAS 1304-56-9.

PB92-135458/REB PC **A03/MF A01**
Drinking Water Health Advisory for Boron.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Cantilli. Apr 91, 26p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water, has issued its report on the element boron: included are the compounds boric acid and borax(sodium tetraborate). It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Potable water, *Water quality, *Water pollution effects(Humans), *Toxicology, *Boron, *Boron compounds, Environmental effects, Pharmacokinetics, Health hazards, Water pollution effects(Animals), Boric acid, Borax, Metabolism, Laboratory animals, Public health, Ingestion(Biology), Carcinogenicity tests, Mutagenicity tests, Teratogens, Chemical analysis, CAS 7440-42-8, CAS 10043-35-3, CAS 1303-96-4.

PB92-135466/REB PC **A03/MF A01**
Drinking Water Health Advisory for Chlorpyrifos.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Cantilli. Apr 91, 31p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water, has issued its report on the insecticide Chlorpyrifos. It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking

water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Potable water, *Water quality, *Water pollution effects(Humans), *Toxicology, Health hazards, Pharmacokinetics, Farm crops, Insecticides, Chlorine organic compounds, Environmental effects, Metabolism, Water pollution effects(Animals), Laboratory animals, Teratogens, Mutagenicity tests, Carcinogenicity tests, Public health, Ingestion(Biology), Chemical analysis, *Chlorpyrifos, Phosphorothioic acid/diethyl-((trichloro-pyridyl)-ester), CAS 2921-88-2.

PB92-135474/REB PC **A03**/MF **A01**
Drinking Water Health Advisory for Isophorone.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Cantilli. Apr 91, 19p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water has issued its report on the chemical isophorone. It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Potable water, *Water quality, *Water pollution effects(Humans), *Toxicology, Environmental effects, Pharmacokinetics, Oxygen organic compounds, Organic solvents, Health hazards, Metabolism, Ingestion(Biology), Public health, Carcinogenicity tests, Mutagenicity tests, Teratogens, Water pollution effects(Animals), Chemical analysis, Laboratory animals, *Isophorone, Cyclohexenone/trimethyl, CAS 78-59-1.

PB92-135482/REB PC **A03**/MF **A01**
Drinking Water Health Advisory for Malathion.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Cantilli. Apr 91, 23p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water has issued its report on the insecticide Malathion. It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Potable water, *Water quality, *Water pollution effects(Humans), *Malathion, *Toxicology, Insecticides, Phosphorus organic compounds, Environmental effects, Pharmacokinetics, Chemical analysis, Health hazards, Metabolism, Public health, Ingestion(Biology), Carcinogenicity tests, Mutagenicity tests, Teratogens, Water pollution effects(Animals), CAS 121-75-5.

PB92-135490/REB PC **A03**/MF **A01**
Drinking Water Health Advisory for p-Nitrophenol.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Cantilli. Apr 91, 24p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water has issued its report on the chemical nitrophenol. It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Nitrophenol, *Potable water, *Water quality, *Water pollution effects(Humans), *Toxicology, Aromatics, Environmental effects, Pharmacokinetics, Health hazards, Water pollution effects(Animals), Teratogens, Mutagenicity tests, Carcinogenicity tests, Ingestion(Biology), Chemical analysis, Public health, Metabolism, CAS 100-02-7.

PB92-135508/REB PC **A03**/MF **A01**
Drinking Water Health Advisory for Phenol.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Cantilli. Apr 91, 26p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water, has issued its report on the chemical phenol. It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Potable water, *Water quality, *Water pollution effects(Humans), *Toxicology, *Phenol, Environmental effects, Pharmacokinetics, Health hazards, Metabolism, Public health, Chemical analysis, Aromatics, Ingestion(Biology), Carcinogenicity tests, Mutagenicity tests, Teratogens, Water pollution effects(Animals), CAS 108-95-2.

PB92-135516/REB PC **A03**/MF **A01**
Drinking Water Health Advisory for Silver.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Cantilli. Apr 91, 28p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water has issued its report on the metal silver. It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Potable water, *Water quality, *Water pollution effects(Humans), *Toxicology, *Silver, Environmental effects, Metals, Pharmacokinetics, Health hazards, Metabolism, Public health, Ingestion(Biology), Carcinogenicity tests, Mutagenicity tests, Teratogens, Water pollution effects(Animals), Chemical analysis, CAS 7440-22-4.

PB92-135524/REB PC **A03**/MF **A01**
Drinking Water Health Advisory for Thallium.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
R. Cantilli. Apr 91, 28p

The Health Advisory Program, sponsored by the Environmental Protection Agency's Office of Water, has issued its report on the metal thallium: included are the compounds thallium chloride and thallium sulfate. It provides information on the health effects, analytical methodology, and treatment technology that would be useful in dealing with the contamination of drinking water. Health Advisories (HAs) describe nonregulatory concentrations of drinking water contaminants at which adverse health effects would not be anticipated to occur over specific exposure durations. HAs serve as informal technical guidance to assist Federal, State, and local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not legally enforceable Federal Standards and are subject to change as new information becomes available.

Keywords: *Thallium, *Thallium compounds, *Potable water, *Water quality, *Water pollution effects(Humans), *Toxicology, Thallium chlorides, Thallium sulfates, Environmental effects, Pharmacokinetics, Health hazards, Water pollution effects(Animals), Metals, Teratogens, Mutagenicity tests, Carcinogenicity tests, Ingestion(Biology), Chemical analysis, Public health, Metabolism, CAS 7440-28-0, CAS 7791-12-0, CAS 7446-18-6.

PB92-135904/REB PC **A04**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Hazardous Air Pollutant Program (HAP-PRO). User's Manual (for Use with Version 1.0, January-September, 1990).
Pacific Environmental Services, Inc., Durham, NC.
S. Moore. Oct 91, 71p EPA/SW/DK-92/025A
Contract EPA-68-C8-001
For system on magnetic tape see, PB92-501212.
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The document is a user's manual for Version 1.0 of EPA's Hazardous Air Pollutant Program (HAP-PRO), and was prepared to assist permit engineers in reviewing applications for control of air toxics by calculating the capital and annual costs for six volatile organic compound (VOC) and three particulate control devices, including selected engineering parameters, which may be used to help pinpoint errors in the engineering design. Calculations used by the program mirror those presented in the revised EPA handbook, Control Technologies for Hazardous Air Toxics. A secondary purpose of HAP-PRO is to generate lists of all facilities containing a specified pollutant in their emission streams or a specified type of emission stream (organic or inorganic vapors and particulates). HAP-PRO's features include context-sensitive help to assist in data input, a windowed environment to provide a referential trail of the user's actions, lookup tables containing the characteristics of many common pollutants, and the ability to select air toxics either from an alphabetical list or by SIC category. HAP-PRO runs on all IBM compatible personal computers and requires an MS-DOS Version 3.1 or greater, a hard disk with at least 1 megabyte free, and 512 K free minimum RAM.

Keywords: *User manuals(Computer programs), *Air pollution control equipment, *Toxic substances, *Cost analysis, Mathematical models, Documentation, Volatile organic compounds, Particles, Listings, Standard industrial classification, Capitalized costs, Design criteria, Performance evaluation, *Hazardous Air Pollutant Program.

PB92-136183/REB PC **A06**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Evaluation of Sampling Alternatives for Bioaerosols. Phase 2: Viable Microorganism Sampling Efficiency.
National Inst. for Occupational Safety and Health, Cincinnati, OH. Engineering Control Technology Branch.
P. A. Jensen, G. N. Davis, and W. F. Todd. Oct 91, 119p CT-160-08
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

A study was undertaken of the relative sampling efficiencies of eight bioaerosol samplers. Each was individually challenged with a bioaerosol of either Bacillus-subtilis or Escherichia-coli. The samplers were evaluated under controlled conditions in a horizontal bioaer-

osol chamber. During each run simultaneous samples were collected with a reference Ace Glass All Glass Impinger-30 (AGI-30) to verify the concentration of microorganisms in the chamber from run to run and day to day. The collection efficiency of the evaluated AGI-30 relative to the reference AGI-30 was 100%. The Andersen Six Stage Viable Particle Sizing Sampler (6-STG) over sampled the reference AGI-30 by about 7%. However, the Andersen Two Stage samplers undersampled the reference AGI-30 by 8%, 11%, and 32%, respectively. The relative collection efficiencies of the Gelman 47mm Membrane Filter, PBI Surface Air System and Biotest Reuter Centrifugal Sampler were less than 1% for E-coli. The low relative efficiency of the Membrane Filter with E-coli was probably due to desiccation of the organism. The Surface Air System and the Reuter Centrifugal Sampler were not efficient collectors of small particles. The relative efficiency of the Membrane Filter with B-subtilis was similar to that of the reference AGI-30. For aerosols of free bacteria, the Andersen Six Stage impactor, the Ace Glass AGI-30, and the Andersen One Stage impactor gave comparable results.

Keywords: *Air samplers, *Biological aerosols, *Performance evaluation, Industrial hygiene, Bacteria, Biotechnology, Air pollution monitoring, Indoor air pollution, Laboratory tests.

PB92-136795/REB PC **A03/MF A01**
Clean Air Act Section 183(d) Guidance on Cost-Effectiveness.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
F. Bunyard, and A. Siwik. Nov 91, 34p EPA/450/2-91/008
See also PB90-169954.

The document provides guidance on achieving at lower cost the compliance milestones for reductions of ozone precursor emissions to attain and maintain the national ambient air quality standard (NAAQS) for ozone. The report discusses the fundamentals of cost-effectiveness, the role of cost-effectiveness in State implementation plans, a number of important considerations for cost-effectiveness analysis such as rule effectiveness, rule penetration, and multiple pollutant accounting, and applications of cost-effectiveness analysis.

Keywords: *Ozone, *Air pollution control, *Cost effectiveness, Manuals, Standards, Operating costs, Air pollution control equipment, Cost estimates, Mathematical models, Cost reduction, State government, Sites, Tables(Data), *Clean Air Act Section 183(D).

PB92-136803/REB PC **A04/MF A01**
Characterization of the Wintertime Boise, Idaho, Air Shed: A Comprehensive Field Study Report for the U.S. EPA Office of Air Quality Planning and Standards. Rept. for 1986-87.
Environmental Protection Agency, Research Triangle Park, NC.
V. R. Highsmith, R. B. Zweidinger, C. W. Lewis, R. K. Stevens, and L. D. Claxton. Dec 91, 65p EPA/600/R-92/011
See also PB90-130444, PB80-182066, and PB-295 485.

A large-scale ambient monitoring program was conducted in Boise, Idaho, during the 1986-1987 winter heating season to evaluate the impact of residential wood combustion (RWC) and automotive emissions on the local air shed. Consecutive 12-h particle, organic, and gaseous samples were collected at three primary sampling sites and four auxiliary sites to assess the magnitude of RWC and mobile source emissions and spatial and temporal variability among sites. Fine particle mass, fine particle potassium, and fine particle organic concentrations were elevated during nighttime periods at all the sampling sites indicating that RWC emissions were the primary local source. Fine particle concentrations exceeded 100 micrograms/cu m during four winter nighttime sampling periods when RWC emissions were increased, with the highest fine particle concentrations (126.7 micrograms/cu m) observed during a weekday nighttime period. Increased coarse particle, fine particle lead, CO, and NOx concentrations were observed during weekday and daytime periods, indicating the presence of mobile source emissions. An overview of the design and conduct of the monitoring program as well as descriptive summaries of the key findings are presented.

Keywords: *Air pollution monitoring, *Woodburning appliances, *Mobile pollutant sources, *Air quality, Organic compounds, Motor vehicles, Residential buildings, Exhaust emissions, Combustion products, Fines, parciles, Potassium, Nitrogen oxides, Carbon monoxide, Spatial distribution, Temporal distribution, Concentration(Composition), Idaho, Winter, Heating systems, Lead, *Boise(Idaho).

PB92-136811/REB PC **A04/MF A01**
Corvallis Environmental Research Lab., OR.
Pilot Study to Compare Created and Natural Wetlands in Western Washington and Evaluate Methods.
ManTech Environmental Technology, Inc., Corvallis, OR.
J. C. Sifneos, D. L. Frostholm, M. E. Kentula, M. Rylko, and K. Kunz. Jan 92, 55p EPA/600/R-92/013
Contract EPA-68-C8-0006
See also PB89-143026. Prepared in cooperation with Corps of Engineers, Seattle, WA. Seattle District. Sponsored by Corvallis Environmental Research Lab., OR.

Nine created wetlands were paired with nine natural wetlands and compared for species composition, species diversity, wetland function and other site characteristics. Results from comparison of species composition and species diversity indicated that some differences existed between the created and natural sites. However, because differences also existed in the data collected from different teams sampling the same site. A comparison of species composition also found some similarities with respect to the native/introduced and indicator status of the species found at the created and natural sites.

Keywords: *Vegetation, *Salt marshes, *Swamps, *Washington(State), Sampling, Comparison, Plants(Botany), Species diversity, Site surveys, Indicator species, Classifying, *Natural Wetlands, *Artificial wetlands, Clean Water Act.

PB92-136829/REB PC **A14/MF A03**
Corvallis Environmental Research Lab., OR.
Analysis and Interpretation of Zooplankton Samples Collected during Phase 2 of the Eastern Lake Survey.
Academy of Natural Sciences of Philadelphia, PA.
A. J. Tessier, and R. J. Horwitz. Jan 92, 303p REPT-88-18, EPA/600/R-92/012
See also PB87-110383 and PB86-232584. Sponsored by Corvallis Environmental Research Lab., OR.

Samples from 146 lakes in the northeastern United States, collected during Phase II of the Eastern Lake Survey (ELS-II) were analyzed for abundance of each species and each size class of zooplankton. The composition of zooplankton assemblages (not abundance) exhibited clear relationships with physical and chemical features of the lakes. Assemblage structure was examined at various levels: diversity, major genera, and individual species. Genera and species level identifications revealed the clearest relationships to water chemistry, although significant relational patterns were discerned using only major taxonomic groups or size structure information. Significant regional influences (biogeographic patterns) were also observed at various levels of organization (major taxonomic groups, genera, species, and diversity). These results illustrate the utility of studying zooplankton assemblages as sensitive indicators of water chemistry. The report makes recommendations for improving methods of relating zooplankton species to environmental factors.

Keywords: *Zooplankton, *Biological indicators, *Water pollution effects, *Lakes, *Water chemistry, Aquatic ecosystems, Biological communities, Acidification, Species diversity, Surface waters, Regional analysis, Environmental effects, Graphs(Charts), Sampling, *Northeast Region(United States).

PB92-136837/REB PC **A08/MF A02**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Indoor Air Pollutants from Household Product Sources: Project Report.
Midwest Research Inst., Kansas City, MO.
T. M. Sack, and D. H. Steele. Sep 91, 157p EPA/600/4-91/025
Contract EPA-68-02-4252
See also PB88-100060 and PB88-132899. Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

A Gas Chromatography/Mass Spectrometry (GS/MS) data base obtained during the analysis of 1,159 household products for six common chlorocarbon solvents has been reanalyzed for the presence and concentration of 25 additional chemicals. Using computerized GS/MS software, 1,043 of the original GC/MS data files were recovered and analyzed for the presence of the additional chemicals. Of the 25 additional chemicals, those found most frequently in the household products include acetone (315 products), 2-butanone (200 products), methylcyclohexane (150 products), toluene (488 products), ethylbenzene (157 products), m-xylene (101 products, and o,p-xylene (93 products). A total of 63.6% of the products analyzed in the study contained one or more of the 25 additional analytes at concentrations greater than or equal to 0.1% by weight. The quantitative information presented in the report is also available on diskette in a spreadsheet format.

Keywords: *Households, *Solvents, *Chromatographic analysis, Chlorine compounds, Chlorohydrocarbons, Acetone, Methyl ethyl ketone, Toluene, Ethyl benzene, Xylene, Concentration(Composition), Tables(Data), Cleaning agents, Paints, Lubricants, Tables(Data), *Indoor air pollution, Diskette.

PB92-136845/REB PC **A03/MF A01**
Effects of Ozone on Crops. Book chapter.
Corvallis Environmental Research Lab., OR.
9 Dec 91, 48p EPA/600/A-92/001
Pub. in U.S. Environmental Protection Agency, QAQPS, on Tropospheric Ozone, p1-48, 9 Dec 91. See also PB84-177989. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR.

Ambient O3 produces significant impacts to crops across the United States. Field studies have moved from characterization of O3 foliar injury symptoms to quantification of yield losses using open-top chambers in order to develop O3 exposure-yield loss functions. These loss functions, in conjunction with ambient O3 exposure and crop distribution data, have been used to predict a current 14% yield loss (for the years 1982-1987) for major U. S. crops. Yield losses would still occur even if all U.S. sites would attain the current secondary National Ambient Air Quality Standards. It is apparent therefore, that the form and level of the current standard is not protective of crop production.

Keywords: *Ozone, *Air pollution, *Farm crops, *United States, Field tests, Yield, Losses, Exposure, Injuries, Leaves(Botany), Mathematical prediction, Necrosis, Plant growth, Standards, Soybean plants, Wheat plants, *Air pollution effects(Plants), Open top chambers, Air quality act.

PB92-136852/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Comparison of Organic Emissions from Laboratory and Full-Scale Thermal Degradation of Sewage Sludge. Journal article.
Dayton Univ., OH. Research Inst.
D. A. Tirey, R. C. Striebich, B. Dellinger, and H. E. Bostian. c1991, 21p EPA/600/J-92/001
Contract EPA-68-03-3346
Pub. in Hazardous Wastes and Hazardous Materials, v8 n3 p201-218 1991. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Samples of sewage sludge burned at one fluidized-bed and three multiple-hearth incinerators were subjected to laboratory flow reactor thermal decomposition testing under both pyrolytic and oxidative atmospheres. The laboratory test results indicated that biomass decomposition products, not toxic industrial contaminants, comprised the majority of the emissions. Benzene, toluene, ethylbenzene, acrylonitrile, and acetonitrile were consistently the most environmentally significant products of thermal exposure. Comparison of the results from in the study with those obtained in the field was complicated by an apparent loss of volatile chlorocarbons from the sludge samples received for laboratory testing. However, quantitative comparison of emission factors derived from lab and field results for

those compounds observed in both studies showed excellent correlation for the pyrolysis testing.

Keywords: *Sewage sludge, *Sludge disposal, *Air pollution sampling, *Incineration, *Organic compounds, Comparison, Experimental design, Field tests, Pyrolysis, Combustion products, Waste disposal, Biomass, Decomposition, Combustion efficiency, Benzene, Toluene, Acrylonitriles, Ethyl benzene, Reprints.

PB92-136860/REB PC A03/MF A01
Observations on Studies Useful to Asbestos Operations and Management Activities. Journal article.
Environmental Protection Agency, Cincinnati, OH.
R. C. Wilmoth, T. J. Powers, and J. R. Millette. c1991, 14p EPA/600/J-92/002
Pub. in Microscope, v39 p299-313 1991. See also PB88-185640. Prepared in cooperation with Vander Wood and Associates, Inc., Norcross, GA.

Asbestos-containing materials found in buildings may release asbestos fibers into the air. Some of these fibers will eventually settle and attach to room surfaces (walls, furnishings, equipment, floors, and carpet) as part of normal dust. Activities like dusting, sweeping and vacuuming are likely to re-entrain the dust causing exposure to airborne asbestos. The paper discusses data that are largely observational in nature, but are illustrative of general trends of interest to those individuals dealing with the day-to-day problems of asbestos in buildings.

Keywords: *Asbestos, *Buildings, *Air pollution, Fibers, Construction materials, Settling, Walls, Floors, Equipment, Releasing, Dust, Cleaning, Exposure, Environments.

PB92-136878/REB PC A02/MF A01
Evaluation of Waste Stabilized by the Solidltech SITE Technology. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
W. E. Grube. c1990, 9p EPA/600/J-92/003
Pub. in Jnl. of Air and Waste Management Association, v40 n3 p310-316 1990. See also PB91-129817.

The Soliditech technology demonstration was conducted at the Imperial Oil Company/Champion Chemicals Superfund Site in Monmouth County, New Jersey. Contamination at the site includes PCBs, lead (with various other metals) and oil and grease. The process mixes the waste material with proprietary additives, pozzolanic materials, and water, in a batch mixer. Technical criteria used to evaluate its effectiveness include (1) short-term extraction and engineering tests; (2) long-term extraction and and leaching tests; (3) petrographic examination; and (4) structural integrity observations. Three different waste types-contaminated soil, waste filter cake material and oily sludge-and a sand blank were treated. Neither PCBs nor volatile organic compounds were detected in the extracts of treated wastes. Significantly reduced amounts of metals were detected in the extracts of treated wastes compared to untreated.

Keywords: *Chemical stabilization, *Solidification, *Waste disposal, *Waste treatment, Lead(Metal), Mixtures, Oils, Chlorine organic compounds, Biphenyl, Additives, Extraction, Tests, Performance evaluation, Soils, Removal, Sampling, Leaching, *Superfund, Remedial action, *Monmouth(New Jersey), Polychlorinated biphenyls, Soliditech process.

PB92-136886/REB PC A02/MF A01
Prevention of Waterborne Cholera in the United States. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
G. Craun, D. Swerdlow, R. Tauxe, R. Clark, and K. Fox. c1992, 8p EPA/600/J-92/004
Pub. in Jnl. of Air and Waste Management Association, v83 n11 p40-45 Nov 91. See also PB91-137307.

Since the outbreak of cholrea in Peru in January 1991, the disease has spread to other Latin-American countries and on several occasions has been imported into the United States. In order to assess the risk of transmission of cholera by water in the United States, an ad hoc committee from the Centers for Disease Control (CDC) and the US Environmental Protection Agency (USEPA) prepared a report (on which this article is based) on the etiology of cholera, the history of outbreaks, symptoms and treatment, transmission and survival, analysis of clinical and water specimens, and prevention of epidemics through water treatment and monitoring. The report also describes the steps that have been taken by CDC and USEPA in South America and recommends future action.

Keywords: *Cholera, *Microorganism control(Water), *Public health, *Water treatment, *United States, History, Disease outbreaks, Peru, Epidemiology, Disease vectors, Water analysis, Monitoring, Water quality, *Waterborne diseases, Vibrio cholera biotype El tor, Drinking water.

PB92-136894/REB PC A02/MF A01
Stratospheric Ozone Protection: An EPA Engineering Perspective. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
W. J. Rhodes. cDec 91, 8p EPA/600/J-92/005
Pub. in Jnl. of Air and Waste Management Association, v41 n12 p1579-1584 Dec 91. See also PB90-112574.

The paper discusses stratospheric ozone protection from an EPA engineering perspective. Chlorine released in the atmosphere is a major factor in depleting the stratospheric ozone protective layer in the atmosphere. The Montreal Protocol as amended in 1990 and the Clean Air Act Amendments of 1990 address the limits and schedules to be placed on chlorine- and bromine-containing chemicals. The status of technology solutions to the problem for chlorofluorocarbons, halons, methylchloroform, and carbon tetrachloride in the major use areas of refrigeration, foam, aerosols, fire protection, and solvents is discussed. Included are cooperative efforts involving academia, industry, the U.S. Government, and nations who are contributing to the success that is being achieved.

Keywords: *Ozone, *Stratosphere, *Air pollution abatement, Protection, Chlorine organic compounds, Carbon tetrachloride, Chlorohydrocarbons, Chloroform, Bromine, Solvents, Foam, Aerosols, Refrigerants, Fire protection, Industries, Regulations, Cooperation, US government, Foreign countries, Clean Air Act Amendments of 1990, Chlorofluorocarbons, Montreal Protocol of 1990, Recycling.

PB92-136902/REB PC A03/MF A01
Air Force Office of Scientific Research, Bolling AFB, DC.
Physiologically Based Toxicokinetic Model for the Uptake and Disposition of Waterborne Organic Chemicals in Fish. Journal article.
Environmental Research Lab.-Duluth, MN.
J. W. Nichols, J. M. McKim, M. E. Andersen, M. L. Gargas, and H. J. Clewell. c1990, 17p EPA/600/J-92/006
Grant AFOSR-ISSA-89-0060
Pub. in Toxicology and Applied Pharmacology 106, p433-447 1990. Prepared in cooperation with Harry G. Armstrong Aerospace Medical Research Lab., Wright-Patterson AFB, OH. Sponsored by Air Force Office of Scientific Research, Bolling AFB, DC.

A physiologically based toxicokinetic model was developed to predict the uptake and disposition of waterborne organic chemicals in fish. The model consists of a set of mass-balance differential equations which describe the time course of chemical concentration within each of five tissue compartments: liver, kidney, fat, and richly perfused and poorly perfused tissue. Model compartmentalization and blood perfusion relationships were designed to reflect the physiology of fishes. Chemical uptake and elimination at the gills were modeled as countercurrent exchange processes, limited by the chemical capacity of blood and water flows. The model was evaluated by exposing rainbow trout (Oncorhynchus mykiss) to pentachloroethane (PCE) in water in fish respirometer-metabolism chambers. Exposure to 1500, 150, or 15 microgram PCE/liter for 48 hr resulted in corresponding changes in the magnitude of blood concentrations without any change in uptake kinetics. The extraction efficiency for the chemical from water decreased throughout each exposure, declining from 65 to 20% in 48 hr. Extraction efficiency was close to 0% in fish exposed to PCE to near steady state (264 hr), suggesting that very little PCE was eliminated by metabolism or other extrabranchial routes. Parameterized for trout with physiological information from the literature and chemical partitioning estimates obtained in vitro, the model accurately predicted the accumulation of PCE in blood and tissues, and its extraction from inspired water. These results demonstrate the potential utility of the model for use in aquatic toxicology and environmental risk assessment. (Copyright (c) 1990 by Academic Press, Inc.)

Keywords: *Water pollution effects(Animals), *Pharmacokinetics, *Trout, *Toxicity, Perfusion, Hemodynamics, Body weight, Biological models, Reprints, *Pentachloroethane, Tissue distribution, Respiratory function tests, Oncorhynchus mykiss.

PB92-136910/REB PC A03/MF A01
Consideration of Pharmacokinetics and Temporal Sensitivity for Hydroxyurea in Relation to Teratogenic Potential. Journal article.
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.
R. P. Beliles, N. G. Makris, and W. J. Scott. c1991, 12p EPA/600/J-92/007, OHEA-C-429
Pub. in Jnl. of the American College of Toxicology, v10 n2 p269-277 1991. Prepared in cooperation with Children's Hospital Research Foundation, Cincinnati, OH., and NGM Consulting, Falls Church, VA.

A compartmental pharmacokinetic-mathematical model for the time-dependent distribution of hydroxyurea (HU) in both the maternal plasma and embryonic fluids of pregnant rats and rhesus monkeys was developed. Across species scaling was based on maternal plasma clearance rates and compartmental sizes as a percent of the body weight of the dam. Mathematical optimization provided the compartmental transfer rates. The estimated maternal and embryonic concentrations of HU correlated well with the experimental pharmacokinetic data regarding both time and quantity for both the rat and the monkey. When the biological effective dose was considered to be the embryonic HU concentration over time (AUC), the dose to the individual embryos was higher in the monkeys (392 mg HU hr/L/day) than in the rats (69 mg HU hr/L/day) at an applied dose of 100 mg HU/kg administered to the dams. The effect of repeated doses as compared with a single dose given only on one day of gestation was examined in the rat. A human embryo dose of 69 mg HU hr/L/day was estimated to result from an i.v. dose of 10 mg/kg to the mother. This concentration produced no effect in the rat. An i.v. dose of 50 mg HU/mg was estimated to result in a human embryo dose of 353 mg HU hr/L/day which approaches a Rhesus monkey embryo dose that produced adverse effects in all embryos.

Keywords: *Hydroxyurea, *Pharmacokinetics, *Teratogenic compounds, *Antineoplastic agents, Monkeys, Embryo, Mathematical models, Humans, Rats, Dose-response relationships, Reprints.

PB92-136928/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Chemical Resistance of Geosynthetic Materials. Journal article.
Southwest Texas State Univ., San Marcos. Dept. of Chemistry.
P. E. Cassidy, M. Mores, D. J. Kerwick, D. J. Koeck, and K. L. Verschoor. c1991, 39p EPA/600/J-92/008
Grant EPA-R-815495
Pub. in Geotextiles and Geomembranes, v11 p61-98 1992. Prepared in cooperation with TRI/International, Inc., Austin, TX. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

In the technical society, environmental safety through controlled technological advances has become increasingly more important. As a result, the need to study the long-term durability and resistance of geosynthetics in contact with hazardous waste has been evident for some time. For this purpose, a study to develop a technological base for geotextiles, geonets and pipes used in containment facilities was undertaken. Information gathered from literature government agencies, academic institutions and industry provided the necessary background for assessment. Geosynthetic materials, exposure media, mechanical and chemical test methods are reviewed. (Copyright (c) 1991 Elsevier Science Publishers.)

Keywords: *Waste management, *Environmental protection, *Chemical resistance, *Hazardous materials, Performance standards, Long term effects, Technology utilization, Exposure, Chemical tests, Linings, Me-

chanical tests, Information transfer, Molecular structure, Polymers, Reprints, *Geosynthetic materials.

PB92-136936/REB PC A02/MF A01
Demonstration of Microfiltration Technology. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
J. F. Martin, K. Topudurti, and S. Labunski. c1991, 7p EPA/600/J-92/009
Pub. in Jnl. of Air and Waste Management, v12 p1653-1657 Dec 91. See also PB92-119023. Prepared in cooperation with PRC Environmental Management, Inc., Chicago, IL.

The U.S. Environmental Protection Agency, under the Superfund Innovative Technology Evaluation (SITE) program in cooperation with E.I. DuPont de Nemours and Company, Inc. (DuPont) and the Oberlin Filter Company (Oberlin), undertook a field demonstration project to evaluate microfiltration technology for removal of zinc and suspended solids from wastewater. The microfiltration system utilized DuPont's Tyvek T-980 membrane filter media in conjunction with the Oberlin automatic pressure filter. The project was undertaken at the Palmerton Zinc Superfund site in April, 1990. Analysis of the treated filtrate indicated that the system removed precipitated zinc and other suspended solids at an efficiency greater than 99.9 percent. (Copyright (c) 1991--Air and Waste Management Association.)

Keywords: *Water pollution control, *Superfund, *Waste treatment, *Liquid wastes, *Land pollution control, Hazardous materials, Ground water, Membranes, Performance evaluation, Design criteria, Technology utilization, Total suspended particulates, Zinc, Reprints, *Microfiltration, *DuPont/Oberlin Microfiltration Treatment System.

PB92-136944/REB PC A02/MF A01
Modeling Studies for Planning: The Green Bay Project. Journal article.
Environmental Research Lab.-Duluth, MN.
J. L. Martin, W. L. Richardson, and S. C. McCutcheon. cJun 91, 10p EPA/600/J-92/010
Pub. in Water Resources Bulletin, Paper No. 89025, v27 n3 p429-439 Jun 92. See also PB90-134370. Prepared in cooperation with ASci Corp., Athens, GA.

A major contaminant monitoring and modeling study is underway for Green Bay, Lake Michigan. Monitoring programs in support of contaminant modeling of large waterbodies, such as for Green Bay, are expensive and their extent is often limited by budget limitations, laboratory capacity, and logistic constraints. Physical/chemical and food chain models were applied using historical data to aid in project planning by identifying processes having the greatest impact on the predictive capability of mass balance models. Studies were also conducted to estimate errors in computed tributary loadings and in-Bay concentrations and contaminant mass associated with different sampling strategies.

Keywords: *Water pollution abatement, *Green Bay, *Lake Michigan, Mathematical models, Field tests, Physical properties, Sampling, Chemical analysis, Chlorine organic compounds, Biphenyl, Food chains, Mass balance, Sediment transport, Design, Reprints, *Toxic substances, Polychlorinated biphenyls, Eutrophication.

PB92-136951/REB PC A02/MF A01
Regional Patterns and Local Variability of Dry and Occult Deposition Strongly Influence Sulfate Concentrations in Maine Lakes. Journal article.
Corvallis Environmental Research Lab., OR.
S. A. Norton, J. S. Kahl, D. F. Brakke, G. F. Brewer, and T. A. Haines. c1988, 9p EPA/600/J-92/013
Pub. in Science of the Total Environment 72, p183-196 1988. See also PB87-110409. Prepared in cooperation with Maine Univ. at Orono, and Western Washington Univ., Bellingham. Inst. for Watershed Studies.

There is great uncertainty and large cost in making dry deposition measurements. The authors present evidence based on wet deposition, evapotranspiration, S storage in lake sediments, and sulfate concentrations in lakes and streams in Maine that the dry deposition flux of sulfur to drainage basins of lakes in Maine ranges from nearly 0% to more than 100% of wet deposition, even in small areas. The regional pattern of sulfate concentrations in Maine lakes is due to gradients in both wet and dry deposition and variation in evapotranspiration. Patterns are modified locally by lakes hydrologic type, elevation, vegetation, and terrestrial drainage basin aspect. (Copyright (c) 1988 Elsevier Science Publishers B.V.)

Keywords: *Air water interactions, *Water pollution, *Surface waters, *Deposition, *Maine, *Acidification, Air pollution, Lakes, Streams, Wet methods, Hydrology, Sediments, Dry methods, Evapotranspiration, Sulfur oxides, Sulfates, Regional analysis, Acid rain, Reprints.

PB92-137181/REB PC A05/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
OAQPS Control Cost Manual (Fourth Edition). Supplement 1. Final rept.
Radian Corp., Research Triangle Park, NC.
R. F. Pandullo, S. K. Lynch, L. B. Evans, D. K. Stone, and W. M. Vatavuk. Jan 92, 96p EPA/450/3-90/006A Contract EPA-68-02-4378
See also PB90-169954. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The document is the first supplement to the OAQPS Control Cost Manual (Fourth Edition). The supplement consists of two new Manual chapters, Chapter 7 (Flares) and Chapter 8 (Refrigerated Condensers). As in the parent Manual, each of these self-contained chapters discusses: (1) the types and applications of the control device (flare or refrigerated condenser); (2) the theory underlying its operation and design; (3) basic sizing/design procedures; and (4) procedures for estimating study-level (+ or - 30%-accurate) capital and annual costs. The chapter also contains current equipment costs for the device, correlated with some gas stream or sizing parameter(s) (e.g., refrigeration tonnage). Each chapter contains a table of contents, list of references, and (if appropriate) appendices to accompany the main subject matter.

Keywords: *Air pollution control equipment, *Flaring, *Refrigerant condensers, *Cost analysis, *Management planning, Stationary sources, Volatile organic compounds, Air pollution, Benefit cost analysis, Capitalized costs, Cost control, Operating costs, Cost estimates, Manuals, Maintenance.

PB92-137199/REB PC A05/MF A01
Study of State Operator Certification Programs.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Apr 91, 90p EPA/570/9-91/005
See also PB87-174694.Portions of this document are not fully legible.

The report discusses administration and certification of state operator programs including experience prerequisites, testing, certificate renewal, enforcement and funding. One section is devoted to operator certification requirements for small systems. There are also three appendices: (1) Summary of states' operator certification programs; (2) Matrices for sample system types; and (3) State summaries.

Keywords: *State programs, *Certification, *Potable water, *Operators(Personnel), *Water pollution abatement, Education, Water treatment, Law enforcement, Requirements, Specialized training, Pollution regulations, Funds, Small systems.

PB92-137207/REB PC A03/MF A01
Upper-Bound Quantitative Cancer Risk Estimate for Populations Adjacent to Sulfur Mustard Incineration Facilities.
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.
A. Koppikar, R. McGaughy, and L. Rhomberg. Jul 91, 50p EPA/600/8-91/053, OHEA-C-291
See also PB91-217885.

The document characterizes the potential cancer hazard to populations residing near sulfur mustard incineration facilities while the incineration is taking place. The carcinogenicity of sulfur mustard is reviewed briefly to show what evidence has lead to the previously-accepted conclusion that sulfur mustard is a known human carcinogen. Two approaches are taken to estimate the upper-bound lifetime cancer risk per unit air concentration. The first approach is to analyze the two sulfur mustard chronic toxicity experiments in Sprague-Dawley rats reported by McNamara, et al. (1975). The second approach is to evaluate and then combine two relative potency estimates: (1) the strain A mouse lung adenoma response to the injection of sulfur mustard compared to the same response to injected 3-methyl cholanthrene as measured in two separate experiments in a relatively narrow time period, and (2) the strain A mouse lung adenoma response to 3-methyl cholanthrene and benzo(a)pyrene (BaP) in the same experiment. The conclusion is that the upper-bound individual and population risks are negligible.

Keywords: *Malignant neoplasms, *Mustard gas, *Incinerators, *Chemical warfare agents, Toxicity, Health hazards, Adenoma, Pulmonary neoplasms, Benzo(a)pyrene, Methylcholanthrene, Mice, Dose-response relationships, Carcinogenicity tests.

PB92-137439/REB PC A04/MF A01
Lead in School Drinking Water.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Jan 89, 63p EPA/570/9-89/001

The purpose of the manual is to assist school officials by providing information on the significance of lead in school drinking water, the health effects of lead, how to detect lead and pinpoint its source, how to reduce or eliminate lead in school drinking water, and how to train personnel in sampling and remedial programs.

Keywords: *Lead(Metal), *Potable water, *Schools, *Manuals, *Water pollution detection, Public health, Specialized training, Personnel, Information transfer, Remedial action, Pollution sources, Water pollution sampling, Water analysis.

PB92-137454/REB PC A06/MF A02
Methods for the Detection of Microorganisms in the Environment.
Commission of the European Communities, Luxembourg.
22 Jan 92, 122p

The document presents an overview and summary of the increasing variety of methods in use for detecting and monitoring microorganisms in the environment. A general overview of detection methods is provided for readers with a general interest in the topic of microbial detection methods which surveys the variety of techniques used in the study of microorganisms in the environment. A more specific analysis of techniques section provides a more detailed examination of individual detection methods. The techniques discussed include those based on direct detection, on culturing, and on nucleic acid hybridization. It is intended to be used as a reference document for regulatory officials, scientists, and others interested in microbial biotechnology.

Keywords: *Detection, *Microorganisms, *Environments, Counting methods, Microscopy, Genes, Nucleic acids, Isotopic labeling, Enzymes, Metabolism, Fluorescent dyes, Bacteria, Soil microbiology, Deoxyribonucleic acids, Culture media, Extraction, Dilution, Nucleic acid hybridization, Gene transfer.

PB92-137462/REB PC A05/MF A01
Risk Assessment Methodologies: Comparing EPA and State Approaches.
Environmental Protection Agency, Washington, DC. Office of Drinking Water.
Sep 90, 80p EPA/570/9-90/012

On April 19-20, 1990, the U.S. EPA held a workshop to discuss current risk assessment methodologies as part of the biannual meeting of the Federal-State Toxicology and Regulatory Alliance Committee. The workshop fostered a discussion among federal and state representatives regarding the risk assessment process and the problems encountered in carrying out that process. The report summarizes the workshop's presentations and discussions; the meeting's attendees, agenda and handouts are included.

Keywords: *Toxicology, *Toxicity, *Meetings, US EPA, State government, Personnel, Mixtures, Guidelines, Standards, Sampling, Drinking water, Public health, New Hampshire, Connecticut, Tests, Clinical medicine, *Risk assessment, Chemicals.

PB92-137470/REB PC **A04/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Achievements in Source Reduction and Recycling for Ten Industries in the United States.
Science Applications International Corp., Cincinnati, OH.
J. W. Tillman, A. Robertson, and E. L. George. Sep 91, 70p EPA/600/2-91/051
Contract EPA-68-C8-0062
Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The report produces 20 short write-ups of examples of recent industry initiatives to implement source reduction and recycling. These examples are taken from 10 different industries. Each write-up contains a description of the company, an overview of the source reduction/recycling measures that the company has implemented, and a summary of the amount of waste that has been reduced and in many cases the amount of money that has been saved.

Keywords: *Waste recycling, *Industrial wastes, *Hazardous materials, *Pollution abatement, Cost analysis, United States, Implementation, Case studies, Metal industry, Crude oil, Printing and publishing industry, Transportation systems, Machinery, Wood products, Electronics, Textile industry, Petroleum products, Food industry, Chemical industry, *Source reduction, *Waste minimization, Resource Conservation and Recovery Act.

PB92-137488/REB PC **A03/MF A01**
Guidelines for Conducting Early Life Stage Toxicity Tests with Japanese Medaka 'Oryzias latipes'.
Environmental Research Lab.-Duluth, MN.
D. A. Benoit, G. W. Holcombe, and R. L. Spehar. Dec 91, 28p EPA/600/3-91/063
See also AD-A227 944.

The manual represents a procedural guide for conducting embryo-larval early life stage (ELS) toxicity tests with Japanese medaka (Oryzias latipes). These procedures are based upon evaluation of published papers and recent methods development work conducted at a laboratory in Duluth. The published papers are referenced in the appropriate places throughout the text of the report. If more detailed information on test apparatus or specific biological and chemical methods is desired, the reader is encouraged to study the reference material or contact one of the authors of the manual. All routine methods not covered in the procedure (physical and chemical determinations), should be followed as described in Standard Methods for the Examination of Water and Wastewater (3). It is suggested that those routines dealing with handling of fish not covered in the procedure should be followed as described by ASTM (4).

Keywords: *Water pollution effects(Animals), *Oryzias, *Life cycles, *Toxic substances, Embryo, Test methods, Manuals, Temperature, Exposure, Light, Oxygen, Guidelines.

PB92-137496/REB PC **A03/MF A01**
Guidelines for Culturing the Japanese Medaka, 'Oryzias latipes'.
Environmental Research Lab.-Duluth, MN.
J. Denny, R. Spehar, K. Mead, and S. Yousuff. Dec 91, 48p EPA/600/3-91/064
See also PB92-137488. Prepared in cooperation with AScI Corp., Duluth, MN.

The paper describes culture techniques for producing large numbers of all life stages of Japanese medaka, Oryzias latipes, for use in biological research. The biology of the medaka is described as it relates to culturing practices and the physical systems used to maintain a large culture. The physical systems include water delivery apparatus, tanks, incubation pans, lighting, spawning substrates and other useful tools. The biological section addresses water temperature, spawning ratios, embryo incubation, juvenile rearing, and larval and adult feeding.

Keywords: *Aquaculture, *Oryzias, Life cycles, Light, Temperature, Breeding, Nutrition, Artemia, Embryo, Fish diseases, Guidelines.

PB92-137504/REB PC **A10/MF A03**
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
Seminar Publication: Nonpoint Source Watershed Workshop. Held in New Orleans, Louisiana, January 29-31, 1991.
Eastern Research Group, Inc., Arlington, MA.
1 Sep 91, 210p EPA/625/4-91/027
See also PB90-141003 and PB92-113463. Sponsored by Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.

On January 29-31, 1991 the U.S. EPA's Center for Environmental Research Information and Nonpoint Source Control Branch sponsored the Nonpoint Source Watershed Workshop. The workshop addressed the management of nonpoint source water pollution problems on a watershed basis. Using a combination of formal technical presentations and small workgroup sessions, the workshop enabled the participants to obtain information on specific aspects of watershed management and to apply watershed principles to actual case study examples. The publication presents the formal papers presented at the workshop and the case study results from the small workgroup sessions.

Keywords: *Water pollution, *Meetings, *Nonpoint sources, *Watersheds, *Water quality management, Best technology, Environmental management, Water pollution control, Technology transfer, Information transfer, State implementation plans, Pollution regulations, Case studies, Education, Urban areas, Soil erosion, Biological effects.

PB92-137512/REB PC **A08/MF A02**
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
Material Recovery Facilities for Municipal Solid Waste. Handbook.
PEER Consultants, Inc., Dayton, OH.
Sep 91, 162p* EPA/625/6-91/031
Contract EPA-68-03-3490
Prepared in cooperation with CalRecovery, Inc., Richmond, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.

The purpose of the document is to address the technical and economic aspects of material recovery facility (MRF) equipment and technology in such a manner that the document may be of assistance to solid waste planners and engineers at the local community level. The document points out what technically can be done, what material specifications can be achieved, and what the different manual and mechanical materials separation and recovery approaches can cost. The handbook is designed for use primarily by engineering or other technically trained personnel who are engaged in some aspect of design, specification, purchase, or implementation of MRFs. Sources of information for the document include the design engineering community, vendors of equipment, and various studies funded by the U.S. EPA. Of course, many presently operating MRFs also served as prime sources of information.

Keywords: *Materials recovery, *Solid waste management, *Handbooks, *Materials handling equipment, *Resource recovery facilities, Specifications, Technology utilization, Implementation, Separation, Engineering personnel, Waste recycling, Economic analysis, Performance evaluation, Marketing, Costs, *Material recovery facilities.

PB92-137520/REB PC **A05/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Demonstration of Fuel Cells to Recover Energy from Landfill Gas. Phase 1 Final Report: Conceptual Study. Rept. for Jan-Sep 91.
International Fuel Cells Corp., South Windsor, CT.
G. J. Sandelli. Jan 92, 86p FCR-11900A, EPA/600/R-92/007
Contract EPA-68-D1-0008
See also PB91-197061. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report discusses results of a conceptual design, cost, and evaluation study of energy recovery from landfill gas using a commercial phosphoric acid fuel cell power plant. The conceptual design of the fuel cell energy recovery system is described, and its economic and environmental feasibility is projected. A conceptual design of the project demonstration was established from the commercial system conceptual design. It addresses the key demonstration issues facing commercialization of the concept. Candidate demonstration sites were evaluated, which led to selection and EPA approval of the demonstration site. A plan is discussed for construction and testing of a landfill gas pretreatment system which will render landfill gas suitable for use in the fuel cell. The final phase of the study will be a demonstration of the energy recovery concept.

Keywords: *Municipal wastes, *Air pollution control, *Fuel cells fuels, *Gas fuels, *Energy recovery, Methane, Design criteria, Performance evaluation, Earth fills, Feasibility studies, Gas production, Economic analysis, Waste disposal, Electric power plants, Pretreatment process.

PB92-137975/REB PC **A11/MF A03**
Corvallis Environmental Research Lab., OR.
Integrating Sustainable Agriculture, Ecology, and Environmental Policy. Proceedings of a Workshop. Held in Arlington, Virginia, on July 22-23, 1991.
ManTech Environmental Technology, Inc., Corvallis, OR.
R. K. Olson. Feb 92, 236p EPA/600/R-92/015
Contracts EPA-68-C8-0006, EPA-68-C0-0021
See also PB89-203392 and PB90-157017. Sponsored by Corvallis Environmental Research Lab., OR.

The role of ecological research in supporting development of one aspect of sustainable use, sustainable agriculture, was evaluated at a conference organized by the U.S. Environmental Protection Agency (EPA) in Arlington, Virginia, July 22-23, 1991. Agriculture contributes to many of the environmental problems for which EPA is seeking solutions; for example, nonpoint source pollution, contamination of groundwater, air toxics, and loss of biodiversity. EPA's new emphasis on prevention rather than mitigation of environmental problems makes the potential environmental benefits of sustainable agriculture attractive to the Agency. EPA's growing expertise in ecology, combined with a recognition of the importance of ecological knowledge as a foundation for sustainable agriculture, led to the conference theme. The objectives of the conference included examining the socioeconomic and political context within which sustainable agriculture must develop, discussing the application of ecological knowledge to developing a sustainable agriculture within this context, and identifying research priorities. These issues were addressed by a series of papers that were presented at the conference and are printed in this volume.

Keywords: *Meetings, *Ecology, *Environmental policy, *Agriculture, *Land management, Nonpoint sources, Ground water, Toxic substances, Species diversity, Pollution abatement, Socioeconomic factors, Farm management, *Sustainable agriculture.

PB92-139369/REB PC **A04/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Greenhouse Gases from Small-Scale Combustion in Developing Countries: A Pilot Study in Manila. Final rept. Jun 90-Sep 91.
Alliance Technologies Corp., Chapel Hill, NC.
K. R. Smith, R. A. Rasmussen, F. Manegdeg, and M. Apte. Jan 92, 75p EPA/600/R-92/005
Contract EPA-68-D9-0173
Prepared in cooperation with East-West Environment and Policy Inst., Honolulu, HI., 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.

The report gives results of sampling of combustion gases released by household cookstoves in Manila, Philippines. In a total of 24 samples, 14 cookstoves were tested, fueled by liquefied petroleum gas (LPG), kerosene (three kinds of stoves), charcoal, and wood. Five ambient samples were analyzed for carbon dioxide (CO2), carbon monoxide (CO), methane (CH4), nitrous oxide (N2O), total non-methane organic compounds (TNMOCs), total alkanes, total alkenes, terpenes, total non-methane hydrocarbons (NMHCs), 88 individual hydrocarbons, total unidentified hydrocarbons, three chlorofluorocarbons (CFCs), and five other halocarbons. Results generally confirm increasing emissions for nearly every measured contaminant of fuels, moving down the energy ladder from gaseous to liquid to processed solid to unprocessed solid. The de-

tailed speciation provided can potentially assist in predicting health risks from such emissions. Although the sample size was far too small to give much confidence in the results, extrapolation of the emission ratios (each gas relative to CO2) to global estimates indicates that published global inventories of several gases important to atmospheric chemistry may be somewhat too small for the fuelwood combustion category. The greenhouse impact of non-CO2 greenhouse gas emissions may rival or exceed those from CO2 alone, when weighted.

Keywords: *Greenhouse effect, *Air pollution sampling, *Stoves, Biomass, Emission factors, Concentration(Composition), Developing countries, Philippines, Fuel substitutes, Carbon dioxide, Health hazards, Global warming, Carbon monoxide, Methane, Nitrogen oxide(N2O), Non-methane hydrocarbons, Alkanes, Alkenes, Terpenes, Organic compounds, *Manila(Philippines), Small systems.

PB92-139377/REB PC A15/MF A03
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Identification and Characterization of Missing or Unaccounted for Area Source Categories. Final rept. Jan-Dec 91.
Alliance Technologies Corp., Chapel Hill, NC.
S. L. Kersteter, D. J. Zimmerman, P. R. Cawkwell, A. Chadha, and B. Henning. Jan 92, 333p CH-91-57, EPA/600/R-92/006
Contract EPA-68-D9-0173
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report identifies and characterizes missing or unaccounted for area source categories. Area source emissions of particulate matter (TSP), sulfur dioxide (SO2), oxides of nitrogen (NOx), reactive volatile organic compounds (VOCs), and carbon monoxide (CO) are estimated annually by the U.S. EPA. Area sources include all mobile sources and any stationary sources that are too small, difficult, or numerous to be inventoried as point sources. A missing or unaccounted for source category is one that does not explicitly appear on the National Emissions Data System (NEDS) area source category list or the State Implementation Plan (SIP) area source category list in Chapter 4 of Procedures for the Preparation of Emissions Inventory for Precursors of Ozone (EPA-450/4-88-021, December 1988). A partial list of missing or unaccounted for categories identified by the project includes: roofing activities; airport, rail yard, and marine support activities; charbroiling; automobile fires; paving or traffic paints; road and highway construction; and wineries.

Keywords: *Air pollution, *Pollution sources, *Exhaust emissions, Combustion products, Particles, Sulfur dioxide, Nitrogen oxides, Volatile organic compounds, Carbon monoxide, Mobile pollutant sources, Stationary sources, Roofing, Transportation systems, Fires, Highways, Construction, Beverages, *Area sources, *Emission inventories.

PB92-139393/REB PC A02/MF A01
New Developments in Emission Projection Methodologies. Rept. for Apr-Sep 91.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
L. G. Jones, and D. C. Misenheimer. 1992, 10p EPA/600/A-92/002
Presented at EI Conference, Durham, NC., September 9-12, 1991.

The paper describes the scope of an EPA research program to develop the Economic Growth Analysis System (EGAS) that will be operated to provide economic inputs for EPA's Regional Oxidant Model (ROM) and Urban Airshed Model (UAM). The Clean Air Act requires states to reduce ozone atmospheric concentrations in areas exceeding the primary ambient standard of 0.120 ppm, and to model their future ozone concentrations to demonstrate the effectiveness of their control programs to attain the primary standard. To assist state and local agency authorities in preparing these ozone projections, EPA has sponsored the development of the UAM, an atmospheric chemistry model, and has published guidance on its operation and use by state and local authorities. The UAM requires boundary conditions, which include the amount of pollutants crossing the boundaries of the area being modeled. Boundary conditions will be supplied from the operation of the ROM. The emissions preprocessor modules for UAM and ROM require various model input parameters for the projection of emissions, including anticipated future year economic activities for all pollutant source categories in the area being modeled. To fulfill the need, EPA has initiated a research program to produce a system (EGAS) for supplying default economic activity inputs in a format usable by UAM and ROM.

Keywords: *Air pollution control, *Ozone, *Air pollution standards, *Mathematical models, Forecasting, Air pollution economics, State government, Atmospheric chemistry, Pollution sources, Pollution regulations, Standards compliance, Clean Air Act, Concentration(Composition), *Urban Airshed Model, *Regional Oxidant Model, Economic Growth Analysis System.

PB92-139401/REB PC A02/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
EPA SITE Demonstration of the Horsehead Resource Development Company Flame Reactor Technology.
Versar, Inc., Springfield, VA.
M. K. Richards, D. Oberacker, M. J. Keefe, J. D. Brunner, and K. G. Partymiller. 1992, 7p EPA/600/A-92/003
Contract EPA-68-C0-0047
Presented at HMCRI's Annual National Conference and Exhibition (12th), Washington, DC., December 3-5, 1991, p675-678. Prepared in cooperation with PRC Environmental Management, Inc., Houston, TX. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The U.S. Environmental Protection Agency's Superfund Innovative Technology Evaluation (SITE) program selected the Horsehead Resource Development Company, Inc. (HRD) Flame Reactor technology for evaluation by demonstration which took place in March 1991. A series of test runs was conducted at the HRD facility in Monaca, Pennsylvania, using 72 tons of secondary lead smelter slag (SLSS) from a Superfund site in Atlanta, Georgia. The SLSS contained zinc, iron, cadmium, and many other metals and inorganic compounds. The HRD Flame Reactor technology is a patented high-temperature thermal process designed to safely treat wastes containing metals. During processing, the waste is introduced to the hottest portion of the HRD Flame Reactor, where it is subjected to greater than 2000 C reducing gas. The waste material reacts rapidly, producing a nonhazardous vitrified effluent slag and gases, including steam and metal vapors. The metal vapors react in the combustion chamber to produce the metal-enriched oxides that are collected in a baghouse. The SITE program evaluated the HRD Flame Reactor for its effectiveness in treating a Superfund site waste, which is hazardous (by Toxicity Characteristic) for cadmium and lead, to form a recyclable metal oxide and a vitrified slag that is nonleachable.

Keywords: *Thermal reactors, *Thermal recovery methods, *Pollution control equipment, *Slags, *Waste treatment, *Performance evaluation, Materials recovery, Lead, Lead oxides, Zinc, Cadmium, Vitrification, Reprints, *Superfund Innovative Technology Evaluation Program.

PB92-139419/REB PC A03/MF A01
Co-Existing with Asbestos: A Look at the Engineering Research Program of the U.S. Environmental Protection Agency.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. C. Wilmoth, B. A. Hollett, and W. N. McCarthy. 1992, 22p EPA/600/A-92/004
Pub. in Proceedings of the Caribbean HAZTECH Conference held in San Juan, Puerto Rico, November 13-15, 1991, p11-30.

The paper discusses the strategy, accomplishments and current direction of a highly experienced engineering-control effort incorporating diversified monitoring and advanced analytical instrumentation directed primarily towards eliminating airborne asbestos emissions in buildings. The paper draws from ten years of field monitoring, release episodes and abatement failures and successes. The advantages as well as certain disadvantages of using the Transmission Electron Microscopy (TEM) for clearance after an abatement action is addressed as is the effectiveness and usefulness of visual inspection to reduce both the cost of TEM analysis and the effectiveness of the removal process. On-site performance evaluations of 'negative-air' High Efficiency Particulate Air (HEPA) cleaners required in abatement operations have provided interesting findings, as has the long-term effectiveness (of non-contaminated air) for various ACM (asbestos-containing materials) removals. Operation and maintenance practices are critiqued based on experiments involving HEPA-vacuuming including the bag-changing practices, and stripping (wax removal) and buffing practices for vinyl asbestos tile (VAT).

Keywords: *Asbestos, *Air pollution abatement, *Buildings, *Air pollution control, Concentration(Composition), Construction materials, Vacuum, Ceramic tiles, Transmission electron microscopy, Air pollution sampling, Risk assessment, Public health, Demolition, Graphs(Charts), Performance evaluation, Reprints, *Indoor air pollution, High efficiency particulate air filters.

PB92-139427/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Seasonal and Annual Biogenic Emission Inventories for the U.S. and Canada. Rept. for Jun-Sep 91.
Alliance Technologies Corp., Lowell, MA.
L. G. Modica, and C. D. Geron. 1992, 15p EPA/600/A-92/005
Contract EPA-68-D9-0173
Presented at Air and Waste Management Association Specialty Conference, Durham, NC., September 9-12, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper summarizes methods and results used to develop an emissions inventory for the U.S. and Canada, used to assess the role of biogenic emissions in ozone formation. Emission inventories were developed at hourly and grid (1/4 x 1/6 degree) levels from input data at the same scales. Resultant emissions were aggregated temporally (to monthly, seasonal, and annual levels) and spatially (to county and state levels). The summary indicates that 53% of annual total biogenic hydrocarbon emissions occur during the summer, but only 4% in the winter. Results are also compared with biogenic emission estimates generated by other researchers, and attempts are made to identify possible causes of observed differences. Recommendations for improvement and further research are discussed. Results of the study will be useful to air quality planners and scientists involved in biological and trace gas research. Historically, ozone control programs based on reductions of known anthropogenic volatile organic compound (VOC) emissions have had limited success in attaining the National Ambient Air Quality Standard. Researchers have therefore been evaluating VOC emission sources not routinely considered in ozone control strategies. One potentially large source of reactive VOCs is emissions from crop and forest foliage.

Keywords: *Natural emissions, *Air pollution sampling, *Ozone, Air pollution control, United States, Canada, Concentration(Composition), Volatile organic compounds, Pollution sources, Air-biosphere interactions, Air quality, Forests, Vegetation, *Emission inventories.

PB92-139435/REB PC A03/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Residential Wood Combustion: Issues and Emission Estimation Techniques.
Alliance Technologies Corp., Chapel Hill, NC.
R. C. McCrillis, C. S. Stoneman, and M. Saeger. Sep 91, 14p EPA/600/A-92/006
Contract EPA-68-D9-0173
Presented at Air and Waste Management Association/ Environmental Protection Agency Specialty Conference, Emission Inventory Issues in the 1990s, Durham, NC., September 9-12, 1991. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses issues and emission estimation techniques for residential wood combustion (RWC). Nonattainment areas for PM-10 (particulate matter nominally 10 micrometers or less in size) are required to submit State Implementation Plans (SIPs) to the U.S. EPA that include emission inventories for RWC. The EPA also provides estimates of PM-10 emissions on a county-by-county basis for a national database.

To improve RWC emission estimates, EPA will oversee three areas of development: (1) EPA will issue emission factors (for inclusion in Supplement D of EPA report AP-42) for woodstoves and fireplaces that will reflect new test data and thus provide more accurate estimates of RWC emissions--the emission factors will also be provided for stoves certified to EPA's Phase I emission limits, and emission factors for EPA-certified Phase II stoves will be based on stove data from actual Phase II stoves; (2) the Joint Emission Inventory Oversight Group (JEIOG) at EPA will improve guidance for inventories since existing guidance for the inventories is not adequate to meet the demands of the amended Clean Air Act; and (3) the JEIOG will develop a model for estimating RWC emissions for every U.S. county for entry into EPA's national Area and Mobile Source Subsystem (AMS) database.

Keywords: *Wood burning appliances, *Stoves, *Fireplaces, *Emission factors, *Air pollution control, Stationary sources, Estimating, Wood, Combustion, Particle size, Air quality, Emission inventories.

PB92-139443/REB PC **A03**/MF **A01**
Degreasing System Pollution Prevention Evaluation. Rept. for Jan-Sep 90.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
C. H. Darvin, and J. Wander. 1990, 13p EPA/600/A-92/007
Presented at Air and Waste Management Association meeting, Vancouver, B.C., June 16-21, 1991. Prepared in cooperation with Air Force Engineering and Services Center, Tyndall AFB, FL.

The paper discusses a joint EPA/USAF study, the objective of which was to evaluate the capability of cost effective degreaser control concepts that eliminate solvent methylchloroform emissions to the atmosphere while complying with industrial hygiene limits. The study represents the only known evaluation dedicated to addressing the industrial hygiene impact and pollution reduction capability of various pollution options simultaneously. Study results indicate that the use of degreaser lip vents can result in significant increases in degreaser emissions. The use of the lip vent can be avoided by the proper installation and use of a freeboard extension, a freeboard chiller, and combinations of the two options. The results indicate that the industrial hygiene safety requirement and pollution control criteria can be achieved without exceeding exposure limit levels by use of the freeboard chiller.

Keywords: *Air pollution abatement, *Occupational safety and health, *Industrial hygiene, *Materials recovery, *Degreasing, Volatile organic compounds, Solvents, Air pollution control, Revisions, Cost effectiveness, Chloroform, Chloroform/methyl.

PB92-139450/REB PC **A02**/MF **A01**
Conceptual Design Issues: Developing a New Highway Vehicle Emissions Estimation Methodology. Rept. for Jun-Aug 91.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
C. T. Ripberger, and J. Markey. 1991, 9p EPA/600/A-92/008
Presented at Air and Waste Management Association Specialty Conference, Durham, NC., September 9-12, 1991.

The paper reports on EPA's effort to define the design of an ideal methodology for estimating emissions from highway vehicles. The design concept will be used by EPA to focus research and promote the availability of accurate, cost effective inventory procedures within 5 to 10 years. Ideally, the resulting method would be sensitive to all potential emission control strategies, including vehicle changes, new fuels, inspection and maintenance strategies, and transportation control measures. Emission estimates from the new procedure would also be calibrated to provide representative values across states and be validated with ambient measurements. Emission inventory estimates are used by EPA and states in models to determine the effectiveness of various control strategies for achieving air quality standards. If the inventory estimates are inaccurate and do not correctly reflect the results of planned controls, costly controls could be implemented without improving the environment. Current estimates indicate that highway vehicles emit over 50% of the reactive hydrocarbons and carbon monoxide (CO) in many ozone and CO nonattainment areas. If highway vehicles were actually responsible for twice this amount, as recent studies have suggested, then control plans for some other smaller sources may produce less desirable and less cost effective results.

Keywords: *Exhaust emissions, *Air pollution control, *Motor vehicles, Air pollution abatement, Highways, Study estimates, Concentration(Composition), Mobile pollutant sources, Fuels, Inspection, Air pollution standards, Hydrocarbons, Carbon monoxide, Ozone.

PB92-139468/REB PC **A03**/MF **A01**
Program to Determine Performance of Fluorinated Ethers and Fluorinated Propanes in a Compressor Calorimeter. Rept. for Jun-Dec 91.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
J. C. Bare. 1991, 12p EPA/600/A-92/009
Presented at International Chlorofluorocarbons and Halon Alternatives Conference, Baltimore, MD., December 3-5, 1991.

The paper discusses a program to determine the performance of fluorinated ethers and fluorinated propanes in a compressor calorimeter. These chlorine-free ethers and propanes are being considered as potential long-term replacements for CFC-11, -12, -114, and -115. A standard compressor calorimeter is being used to evaluate the capacity and performance of these chlorofluorocarbons (CFCs) and their proposed alternatives. An oil-free diaphragm compressor will allow performance testing independent of the effects of oils. Testing is on-going at the Stratospheric Ozone Refrigeration Laboratory of EPA/AEERL at Research Triangle Park, NC.

Keywords: *Fluorohydrocarbons, *Heat measurement, *Calorimetry, *Compressors, *Performance evaluation, Substitutes, Air pollution control, Enthalpy, Refrigerants, Stationary sources, *Fluorinated ethers.

PB92-139476/REB PC **A02**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Superfund Soils Data Management System.
CDM Federal Programs Corp., Fairfax, VA.
J. Schmuller, D. E. Hudson, J. M. Perdek, and R. Troast. 1992, 7p* EPA/600/A-92/010
Contract EPA-68-03-3409
Presented at HMCRI Annual National Conference and Exhibition (12th), Washington, DC., December 3-5, 1991. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The paper describes the Superfund Soil Data Management System (DMS), a PC-based data system being developed by the U.S. Environmental Protection Agency (EPA) in its effort to manage and evaluate treatment and performance data for contaminated soil, sludge, and debris. The system will be used to support two basic EPA objectives: (1) technology transfer; and (2) support for the development of RCRA land disposal restrictions (LDRs) for contaminated soil and debris. CDM Federal Programs Corporation is supporting EPA in the development of this data base. EPA is compiling and evaluating soil, sludge, and debris treatment data from a variety of sources such as: EPA Superfund remedial and removal actions, RCRA and UST corrective actions, SITE program demonstrations, and other research programs; Department of Energy (DOE); Department of Defense (DOD); treatment vendors; private contractors; and research organizations. This influx of data has created the information management need addressed by the Superfund Soil DMS. Written in dBASE III+ (a popular PC-based data base language), the Superfund Soil DMS stores: Quantitative and qualitative data on ex-situ soil, sludge, and debris treatment technologies, Quality control (QC) data (such as blank, spike recoveries, surrogate recoveries, etc.), Bibliographic and site information, and Abstracts and extensive comments regarding treatment performance, successes and problems, design and operating information, and recommendations for additional research.

Keywords: *Superfund, *Waste management, *Data base management, *Information systems, Waste treatment, Ground disposal, Soil contamination, Sludge disposal, Remedial action, US EPA, Performance evaluation, Technology transfer, Pollution regulations, Reprints, *Superfund Soils Data Management System, Cleanup operations, Resource Conservation and Recovery Act.

PB92-139815/REB PC **A06**/MF **A02**
Available Disposal Capacity for Solid Waste in Illinois.
Illinois State Environmental Protection Agency, Springfield. Div. of Air Pollution Control.
Oct 91, 110p IEPA/LPC-91/59
See also fourth annual report, PB91-108712.

Under the Illinois Solid Waste Management Act, IEPA is required to publish an annual report on the remaining landfill capacity in Illinois. This is the fifth annual report published by the IEPA. It details data on volumes of waste accepted at landfills in each county, as well as the reported remaining landfill capacity by county and region. The number of active solid waste landfills in Illinois has gone from 146 in 1987, to 133 in 1988, to 126 in 1989, to 117 in 1990, to 110 in 1991. Solid waste accepted at these facilities in 1991 totalled 41.6 million cubic yards. The reported remaining landfill capacity was 360.9 million cubic yards. At current disposal volumes and capacities, Illinois has between eight and ten years of remaining landfill capacity if no further capacity is added.

Keywords: *Solid waste disposal, *Illinois, *Earth fills, *Capacity, *Hazardous materials, Regulations, Waste recycling, Incineration, Volume, Compost, Imports, Hazardous materials transportation, Exports, Pollution sources, Solid Waste Management Act.

PB92-139955/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Sulfur Dynamics in Mineral Horizons of Two Northern Hardwood Soils. A Column Study with (35)S. Journal article.
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
B. R. Dhamala, M. J. Mitchell, and A. C. Stam. c1990, 18p EPA/600/J-92/012
Pub. in Biogeochemistry 10, p143-160 1990. Sponsored by Corvallis Environmental Research Lab., OR., and Empire State Electric Energy Research Corp., New York.

Sulfur dynamics of two Spodosols were ascertained using soil columns constructed from homogenized mineral soil from northern hardwood ecosystems at the Huntington Forest (HF) in the Adirondack Mountains of New York and Bear Brook Watershed in Maine (BBWM). Columns were leached for 20 weeks with a simulated throughfall solution with (35)SO4(2-). Sulfur constituents were similar to those of other Spodosols with the organic S fractions (C-bonded S and ester sulfate) constituting over 90% of total S. HF soil columns had higher total S (14.9 micromol S/g) than that for the BBWM soil columns (7.4 micromol/g) primarily due to higher C-bonded S in the former. Analyses using both S mass balances and radioisotopes corroborate that for BBWM soil columns, SO4(2-) adsorption-desorption dominated the S biogeochemistry while in HF soil columns, organic S mineralization-immobilization processes were more important. It is suggested that similar techniques can be applied to soils in the field to ascertain the relative importances of SO4(2-) adsorption processes and organic S dynamics.

Keywords: *Soil dynamics, *Sulfur organic compounds, *Mineralization, *Land pollution, *Biogeochemistry, Ecosystems, Sulfur 35, Leaching, Environmental transport, Adsorption, Sulfur oxides, Desorption, Immobilization, Forests, Nutrients, Reprints, *Spodosols.

PB92-140201/REB PC **A11**/MF **A03**
Protection of Tomatoes, Egg Plants, and Peppers: 1979-April 1991. Citations from AGRICOLA Concerning Diseases and Other Environmental Considerations. Bibliographies and literature of agriculture (Final).
National Agricultural Library, Beltsville, MD.
C. N. Bebee. Aug 91, 245p* USDA/BLA-110
Prepared in cooperation with Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.

The citations in the bibliography, The Protection of Tomatoes, Egg Plants, and Peppers, are selected from the AGRICOLA database concerning diseases and other environmental considerations from January 1979 to April 1991.

Keywords: *Farm crops, *Tomato plants, *Vegetable crops, *Bibliographies, Plant diseases, Pest control,

Cultivation, Food contamination, Horticulture, Environmental protection, Food processing, Farm management, *Egg plants, *Pepper plants, AGRICOLA.

PB92-140219/REB PC A12/MF A03
Protection of Nut Crops, 1979-April 1991. Citations from AGRICOLA Concerning Diseases and Other Environmental Considerations. Bibliographies and literature of agriculture (Final).
National Agricultural Library, Beltsville, MD.
C. N. Bebee. Aug 91, 256p* USDA/BLA-109
Prepared in cooperation with Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.

The citations in the bibliography, The Protection of Nut Crops, are selected from the AGRICOLA database concerning diseases and other environmental considerations from January 1979 to April 1991.

Keywords: *Nuts(Fruits), *Farm crops, *Bibliographies, *Pest control, Soil chemistry, Forest management, Plant diseases, Environmental protection, Horticulture, Agricultural machinery, Fungi, Insects, Plant physiology, Farm management.

PB92-140243/REB PC A11/MF A03
Protection of Stored Grains, 1979-April 1991. Citations from AGRICOLA Concerning Diseases and Other Environmental Considerations. Bibliographies and literature of agriculture (Final).
National Agricultural Library, Beltsville, MD.
C. N. Bebee. Aug 91, 228p* USDA/BLA-108
Prepared in cooperation with Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.

The citations in the bibliography, The Protection of Stored Grains, are selected from the AGRICOLA database concerning diseases and other environmental considerations from January 1979 to April 1991.

Keywords: *Farm crops, *Bibliographies, *Grains(Food), *Food storage, *Cereal products, Cultivation, Plant diseases, Pest control, Feeding stuffs, Crop driers, Plant physiology, Environmental protection, Agricultural engineering, Farm management, AGRICOLA.

PB92-140573/REB PC A03/MF A01
Drinking Water from Household Wells.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Sep 90, 15p EPA/570/9-90/013

About 15% of the population have personal wells. Although it has been estimated that less than 2% of the groundwater in the U.S. is contaminated, well owners should be concerned about water quality. The booklet outlines potential ground water contamination sources, how to determine and maintain the adequacy of drinking water from wells, and what to do to remedy any problems with water from personal wells.

Keywords: *Potable water, *Water wells, *Water treatment, *Water pollution control, *Water quality, *Health hazards, *Public health, Regulations, Houses, Water supply, Ground water, Pollution sources, Water analysis.

PB92-140581/REB PC A03/MF A01
Protecting Our Drinking Water from Microbes.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Aug 89, 29p EPA/570/9-89/006

The report explains what causes various waterborne diseases, how public water supplies can control such diseases, and what the EPA is doing under the 1986 Safe Drinking Water Act Amendments to see that the quality of drinking water improves.

Keywords: *Potable water, *Water treatment, *Water pollution abatement, *Aquatic microbiology, *Diseases, *Microorganism control(Water), *Public health, *Health hazards, Water quality, Bacterial diseases, Pollution regulations, US EPA, Water pollution effects(Humans), Safe Drinking Water Act, Maximum Contaminant Level Goals.

PB92-140599/REB PC A03/MF A01
Your Drinking Water: From Source to Tap EPA Regulations and Guidance.
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Apr 90, 20p
Color illustrations reproduced in black and white.

Topics covered include sources of drinking water, kinds of contaminants found in drinking water, how scientists determine an acceptable level for chemicals in drinking water, how the government limits contaminants in water to specific concentration levels, and what to do if there are questions or doubts about the purity of drinking water.

Keywords: *Potable water, *Water supply, *Water treatment, *Regulations, *Water pollution abatement, *Water distribution(Applied), *Public health, *Health hazards, Water users, Water quality standards, Water reuse, Chemical compounds, Cooperation, Water analysis.

PB92-140607/REB PC A02/MF A01
Safe Drinking Water Act: 1986 Amendments.
Environmental Protection Agency, Washington, DC. Office of Drinking Water.
Aug 86, 8p EPA/570/9-86/002

The report briefly describes the 1986 amendments to the Safe Drinking Water Act and outlines the role of the EPA, the states, and local authorities in their implementation.

Keywords: *Regulations, *Water pollution abatement, *Potable water, Health hazards, Implementation, US EPA, State government, Local government, Law enforcement, Environmental protection, Ground water, Water supply, Cooperation, *Safe Drinking Water Act of 1986.

PB92-140755/REB PC A03/MF A01
Toxic Substances Control Act (TSCA) Chemical Substances Inventory: Revised Inventory Synonym and Preferred Name File. January 1992 Magnetic Tape Documentation.
Environmental Protection Agency, Washington, DC.
Jan 92, 39p* EPA/DF/MT-92/027A
For system on magnetic tape see, PB92-140755.

The computer-readable TSCA Chemical Substance Inventory is issued periodically to provide chemical substance information for those substances on the nonconfidential substance identity portion of the TSCA Master Inventory File. 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. Its entries are ordered alphabetically by name with each name accompanied by the same information for the substance as appears in the Preferred Name File.

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

PB92-141290/REB PC A15/MF A03
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Standardized Costs for Water Supply Distribution Systems. Final rept.
HDR Engineering, Inc., Irvine, CA.
R. C. Gumerman, B. E. Burris, and D. E. Burris. Jan 92, 334p EPA/600/R-92/009, , EPA/SW/DK-92/028A
Contract EPA-68-03-3266
For system on diskette, see PB92-501436. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Presented within the report are cost data for construction and operation/maintenance of domestic water distribution and transmission pipelines, domestic water pumping stations, and domestic water storage reservoirs. To allow comparison of new construction with rehabilitation of existing pipelines, cost data is included for cleaning, application of cement mortar lining, slip lining, and a proprietary process called Insituform. Construction cost data for water pumping stations include construction of new installations, including package plants, as well as expansion of existing pumping stations. Operation and maintenance requirements including labor, electrical, and materials are also presented. Storage reservoir construction cost data is presented for ground-level and elevated steel reservoirs, and below-ground and ground-level concrete reservoirs.

Keywords: *Water distribution, *Water supply, *Costs, Economic analysis, Water pipelines, Water storage, Reservoirs, Construction costs, Maintenance, Documentation.

PB92-141373/REB PC A12/MF A03
Handbook: Control Technologies for Hazardous Air Pollutants.
Environmental Protection Agency, Cincinnati, OH. Center for Environmental Research Information.
M. K. Sink. Jun 91, 261p EPA/625/6-91/014

The objective of the handbook is to present a methodology for determining the performance and cost of air pollution control techniques designed to reduce or eliminate the emissions of potentially hazardous air pollutants (HAPs) from industrial/commercial sources. (Note: The term 'hazardous' in the document is very broad. It is not limited to the specific compounds listed under current regulations). The handbook is to be used by EPA regional, State, and local air pollution control agency technical personnel for two basic purposes: (1) to respond to inquiries from interested parties (e.g., prospective permit applicants) regarding the HAP control requirements that would be needed at a specified process or facility, and (2) to evaluate/review permit applications for sources with the potential to emit HAPs.

Keywords: *Air pollution control, *Hazardous materials, Handbooks, Industrial wastes, Businesses, Licenses, Cost analysis, State government, Toxicity, Local government, Personnel, Identifying, Design criteria, Waste treatment, Performance evaluation, Classifying, Inorganic compounds, Organic compounds, Potentially hazardous air pollutants, Point source, Nonpoint source.

PB92-141555/REB PC A07/MF A02
National Air Quality and Emissions Trends Report, 1990.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
T. Curran, R. Faoro, T. Fitz-Simons, N. Frank, and W. Freas. Nov 91, 135p EPA/450/4-91/023
See also PB91-172247 and PB91-206235.Color illustrations reproduced in black and white.

The report presents national and regional trends in air quality from 1981 through 1990 for particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone and lead. Air quality trends are also presented for 15 metropolitan areas. Both national and regional trends in each of these pollutants are examined. National air quality trends are also presented for both the National Air Monitoring Sites (NAMS) and other site categories. In addition to ambient air quality, trends are also presented for annual nationwide emissions. These emissions are estimated using the best available engineering calculations; the ambient levels presented are averages of direct measurements. The report also includes a section, Air Quality Levels in Metropolitan Statistical Areas (MSAs). Its purpose is to provide interested members of the air pollution control community, the private sector and the general public with greatly simplified air pollution information. Air quality statistics are presented for each of the pollutants for all MSAs with data in 1990.

Keywords: *Emission factors, *Air pollution, *United States, Urban areas, Regional analysis, Standards, Forecasting, Monitoring, Carbon dioxide, Sulfur dioxide, Carbon monoxide, Lead(Metal), Nitrogen dioxide, Sites, Ozone, Concentration(Composition), Statistical analysis, Maps, Total suspended particulates, National Air Monitoring Sites(NAMS).

PB92-142652/REB PC **A03/MF A01**
Effects of Glean, a Sulfonylurea Herbicide, on the Reproductive Biology and Fruit Set in Cherry Trees. Progress Report to Region 10.
Corvallis Environmental Research Lab., OR.
T. Pfleeger, J. Fletcher, and H. Ratsch. Feb 92, 18p EPA/600/R-92/020
See also PB85-122505 and PB92-116052. Prepared in cooperation with Oklahoma Univ., Norman.

The research described in the report is part of a three-year project. The final data will be collected on the fruit harvested in the spring of 1993. By the conclusion of the project, all treatments will have been examined twice. Although the authors believe that it is worthwhile to make tentative conclusions at this time to help focus the remaining research on key questions and issues, they feel strongly that as soon as their experiments are completed and the results thoroughly examined, the regulatory process for new pesticides should be reexamined. This should occur no later than 1993.

Keywords: *Plants reproduction, *Herbicides, *Toxic substances, Environmental effects, Pesticides, Plant growth, Pollution regulations, Pesticide drift, Toxicity, Life cycles, Air pollution, Environmental transport, Standards compliance, Fruits, Cherries, Germination, *Glean, *Cherry trees, Urea/sulfonyl, EPA region 10.

PB92-143494/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Limited-Use Chemical Protective Clothing for EPA Superfund Activities. Summary rept.
Little (Arthur D.), Inc., Cambridge, MA.
J. C. Sawicki, C. Mond, A. D. Schwope, and S. Watkins. Feb 92, 46p EPA/600/R-92/014
Contract EPA-68-03-3293
Prepared in cooperation with New York State Coll. of Human Ecology, Ithaca. Dept. of Design and Environmental Science. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Because contractor field personnel complained about the poor durability and fit of limited-use chemical protective clothing (CPC) most commonly used at hazardous waste site operations, the U.S. Environmental Protection Agency (EPA) initiated a study to: characterize use of CPC; determine problems, and communicate results in publications and procurement guidelines. Personnel at two Superfund hazardous waste sites were surveyed about CPC problems. Poor fit of coveralls and lack of fabric durability resulted in garment failures, especially in the seat, crotch, and underarms. Some fabrics were identified that provided improved performance. The commercial market was surveyed, and commercial fabrics for limited-use CPC were identified and obtained. Available standards and specifications describing size and fit parameters for limited-use CPC were identified and reviewed relative to EPA Superfund CPC needs. None of the standards were found to be fully acceptable. American National Standards Institute (ANSI) Standard 101-1985, however, provided a satisfactory baseline for further standards development. Problems with CPC were analyzed and suggested changes to ANSI 101 were developed as a proposed procurement guideline. The information was presented to the Industrial Safety Equipment Association, which developed the ANSI standard.

Keywords: *Protective clothing, *Superfund, *Chemical compounds, *Hazardous materials, *Occupational safety and protection, *Waste disposal, Personnel management, US EPA, Standards compliance, Performance standards, Field tests, Revisions, Fabrics, Specifications, Durability, Remedial action.

PB92-143668/REB PC **A07/MF A02**
Alpha2u-Globulin: Association with Chemically Induced Renal Toxicity and Neoplasia in the Male Rat. Technical rept.
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.
K. P. Baetcke, G. C. Hard, I. S. Rodgers, R. E. McGaughy, and L. M. Tahan. Sep 91, 132p EPA/625/3-91/019F, OHEA-F-385

The report of a Technical Panel of the U.S. Environmental Protection Agency (EPA) Risk Assessment Forum describes conditions under which the Forum advises EPA risk assessors against using information on certain renal tubule tumors or nephrotoxicity to assess human risk. Risk assessment approaches generally assume that chemicals producing tumors in laboratory animals are a potential cancer hazard to humans. For most chemicals, including many rodent kidney carcinogens, this extrapolation remains appropriate. The scientific studies reviewed by the Technical Panel indicate, however, that some other chemicals induce accumulation of alpha(sub 2u)-globulin, a low-molecular-weight protein, in the male rat kidney. Female rats and other laboratory mammals administered the same chemicals do not accumulate low-molecular-weight protein in the kidney and they do not develop renal tubule tumors. Since humans appear to be more like other laboratory animals than like the male rat, in this special situation, the male rat is not a good model for assessing human risk.

Keywords: *Toxicity, *Kidney, *Kidney neoplasms, Rats, Carcinogens, Males, Risk assessment, Kidney diseases, Dose-response relationships, Species specificity, *Alpha 2-microglobulins.

PB92-143676/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Air/Superfund National Technical Guidance Study Series: Estimation of Air Impacts for Soil Vapor Extraction (SVE) Systems.
Radian Corp., Austin, TX.
B. Eklund, S. Smith, P. Thompson, and A. S. Malik. Jan 92, 44p EPA/450/1-92/001
Contract EPA-68-D1-0031
See also PB89-159396, PB91-168476, and PB91-211888. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The U.S. Environmental Protection Agency's Office of Air Quality Planning and Standards and the Regional Air Offices have been given the responsibility to evaluate air impacts from Superfund sites. The report provides procedures for roughly estimating the ambient air concentrations associated with soil vapor extraction (SVE). The procedures for SVE systems are analogous to procedures for air strippers that have previously been published. SVE is also known as soil venting, vacuum extraction, aeration, or in-situ volatilization. It is a widely used technique for removing volatile organic compound (VOC) vapors from contaminated soil. Procedures are given to evaluate the effect of the concentration of the contaminants in the soil-gas and the extraction rate on the emission rates and on the ambient air concentrations at selected distances from the SVE system.

Keywords: *Air pollution abatement, *Environmental impacts, *Hazardous materials, Soils, Removal, Aeration, Venting, Vaporizing, Extraction, Concentration(Composition), Separators, Stripping(Distillation), Toxicity, Field tests, Flow charts, *Superfund, *Remedial action, *Soil vapor extraction, *Volatile organic compounds, Cleanup.

PB92-143684/REB PC **A03/MF A01**
Effects of RVP on Emissions at 20F Ambient Temperature. Technical rept.
Environmental Protection Agency, Ann Arbor, MI. Certification Policy and Support Branch.
B. McIntyre, and P. Enns. Dec 91, 20p EPA/AA/CD/CPSB-92/01
See also PB85-185882.

The Environmental Protection Agency is currently proposing rules that will establish cold carbon monoxide (CO) emission standards. The vehicle emission certification testing will be performed using the Federal Test Procedure (FTP) driving cycle at 20 F ambient temperature. Questions have arisen as to whether the Reid Vapor Pressure (RVP) of the fuel used for the FTP test will have an impact on cold temperature CO emissions. The purpose of the report is to describe the test program used to determine whether the RVP of fuel could affect the CO exhaust emissions of recent technology motor vehicles tested at 20 F ambient temperature.

Keywords: *Air pollution standards, *Carbon monoxide, *Exhaust emissions, *Federal test procedure, Cold weather tests, US EPA, Pollution regulations, Fuels, Air pollution control equipment, *Reid Vapor Pressure.

PB92-143692/REB PC **A03/MF A01**
Evaluation of Research Prototype Vehicles Equipped with Direct Injection Two-Stroke Cycle Engines. Technical rept.
Environmental Protection Agency, Ann Arbor, MI. Control Technology and Applications Branch.
K. H. Hellman, G. K. Piotrowski, and R. M. Schaefer. Jan 92, 41p EPA/AA/CTAB-92/01
See also PB91-206342 and PB92-114255.

The report describes the exhaust emissions and fuel economy results from two prototype vehicles powered by state-of-the-art two-stroke cycle engines. These vehicles were tested over the Federal Test Procedure (FTP) and Highway Fuel Economy Test (HFET) cycles; the sampling process included the measurement of particulate emissions. The report also includes a description of the test vehicles and engines, the tests and procedures used, future efforts, and appendixes containing detailed individual test results for both vehicles.

Keywords: *Automobiles, *Two stroke cycle engines, Exhaust emissions, Fuel consumption, Tests, Fuel economy, Motor vehicles, Federal Test Procedure, Highway Fuel Economy Test.

PB92-143700/REB PC **A99/MF A06**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
NATICH Data Base Report on State, Local and EPA Air Toxics Activities, September 1991. Final interim rept.
Radian Corp., Austin, TX.
Sep 91, 745p* DCN-91-203-099-26-15, EPA/450/3-91/018
Contract EPA-68-D9-0065
Supersedes PB91-187575. See also PB88-197470. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The purpose of the report is to disseminate information provided to the NATICH data base by State and local air agencies and EPA on their air toxics activities. The report supersedes previous reports published in September 1984, March 1985, September 1985, July 1986, July 1987, July 1988, July 1989, and July 1990. It updates the information in the first eight reports and contains information received through August 12, 1991. The report includes a listing of State and local agencies that have provided information to the Clearinghouse, air toxics contacts, regulatory program information, acceptable ambient concentration guidelines or standards and the bases of those guidelines/standards, pollutant research information, methods development activities, permitting data, source testing data, ambient monitoring information, emissions inventory information, and risk assessment information. Because of the large volume of data that now resides in the data base, the document reports only a subset of the permitting and source testing data.

Keywords: *Air pollution sampling, *Air pollution standards, *Toxic substances, *Information dissemination, Risk assessment, State government, Local government, Tables(Data), Guidelines, Pollution regulation, Pollution sources, Concentration(Composition), Directories, US EPA, Permits, *National Air Toxics Information Clearinghouse Data Base, Emission inventories.

PB92-143759/REB PC **A04/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Performance Evaluation of a Variable Speed, Mixed Refrigerant Heat Pump.
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD.
P. I. Rothfleisch, and D. A. Didion. Jun 91, 59p NISTIR-4597
See also PB87-152286 and PB88-218227. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The performance of an innovative heat pump, equipped with a distillation column to shift the composition of a zeotropic refrigerant mixture, was evaluated. The results of the DoE rating tests and seasonal energy calculations are reported with the main cycle refrigerant compositions. No composition shifting of the circulating refrigerant mixture was observed. To demonstrate the potential value of composition shift-

ing, an ideal vapor compression cycle computer program was used to predict what the system performance would have been had composition shifting occurred. Seasonal energy usage calculations based on the computer predictions demonstrated that the effect of composition shifting on HSPF was very small, increasing slightly with climate zone. However, the savings in auxiliary heat was found to be substantial. In cooling mode, computer predictions showed pure R22 to have a SEER approximately two percent higher than a mixture of 20% R13B1 and 80% R22 by weight.

Keywords: *Heat pumps, *Space HVAC systems, Performance evaluation, Heating load, Cooling load, Air source heat pumps, Buildings, Refrigerants.

PB92-143783/REB PC A03/MF A01
Development of a National Consensus Standard for Quality Assurance for Environmental Programs.
Environmental Protection Agency, Research Triangle Park, NC. Quality Assurance Management Staff.
G. L. Johnson, and D. W. Wolfe. 1991, 12p EPA/600/A-92/011
Proceedings of the 1992 Annual TRADE Conference (15th), St. Petersburg, FL., November 19, 1991. See also PB83-170514. Prepared in cooperation with MAC Technical Services, Alameda, CA.

Decisions on where and how to clean-up Federally-owned facilities contaminated by mixtures of hazardous chemical and radioactive wastes requires that quality environmental data be obtained. The Federal Government is currently using several different standards or sets of requirements for establishing the quality assurance and quality control (QA/QC) procedures associated with environmental data operations for these sites. These standards defined the criteria for the QA activities and documentation required, the content and format of the documentation, and who was responsible for implementation. Shortcomings in these standards or requirements led in 1989 to efforts by several public and private sector groups to 'harmonize' the multiple sets of standards and requirements into a single set. These efforts are being conducted under the auspices of the American Society for Quality Control (ASQC) and involve participation by the Environmental Protection Agency (EPA), Department of Energy (DOE), Department of Defense (DOD), Nuclear Regulatory Commission (NRC), and others in the contractor and regulated communities. The paper describes the progress toward establishing a national consensus standard for QA for environmental programs through the ASQC standard-setting process.

Keywords: *Hazardous materials, *Radioactive wastes, *Remedial action, *Waste management, *Standards, *Quality assurance, Quality control, Federal agencies, Pollution regulations, Requirements, Operation, Environmental management, Implementation, Cleanup operations.

PB92-143791/REB PC A02/MF A01
Quality and Environmental Protection: The EPA QA Program.
Environmental Protection Agency, Washington, DC. Quality Assurance Management Staff.
G. L. Johnson, and N. W. Wentworth. 1992, 9p EPA/600/A-92/012
See also PB91-240523.

Formalized quality assurance (QA) program requirements for the U.S. Environmental Protection Agency (EPA) have been established for more than ten years. During this period, the environmental issues and concerns addressed by the EPA have changed. Other issues, such as hazardous waste clean-up and clean air, remain a focus of national environmental concerns. As environmental issues in the 1980s evolved, the QA program of the EPA was transformed through the use of Total Quality Management (TQM) principles to meet the needs of the 1990s and beyond. The QA program is structured to provide the necessary management and technical processes to effectively plan, implement, and assess the results of work performed in environmental programs.

Keywords: *Hazardous materials, *Waste management, *Quality assurance, Standards, Requirements, Quality control, Performance evaluation, Government agencies, Project management, US EPA, Assessments, Requirements, Decision making, *Superfund, Cleanup, Total quality management.

PB92-143809/REB PC A03/MF A01
Robert S. Kerr Environmental Research Lab., Ada, OK.
Adsorption of Surfactants (Chapter 7). Book chapter.
State Univ. of New York at Stony Brook. Marine Sciences Research Center.
B. J. Brownawell, H. Chen, W. Zhang, and J. C. Westall. 1991, 24p EPA/600/A-92/013
Grant EPA-R-816875
Pub. in Organic Substances and Sediments in Water: Processes and Analytical, v2 1991. See also PB80-189574. Prepared in cooperation with Oregon State Univ., Corvallis. Dept. of Chemistry. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Surfactants are used in increasingly large quantities in a number of consumer and industrial products. Adsorption of surfactants to surfaces of suspended particles affects their removal in waste treatment plants. Adsorption of surfactants on particles affects their distribution, fate, and effects in natural waters. Experiments were conducted to study the properties of surfactant (charge and structure), solution (H(+)), (Ca(2+)), and (Na(+)), and sorbent (e.g., organic carbon and cation exchange capacity) that affect adsorption. The surfactants studied included dodecylpyridinium, homologs of linear alkylbenzenesulfonates, and homologs of 'alcohol ethoxylates' (monoalkyl ethers of poly(ethylene glycol)). Adsorption isotherms were determined for a set of five soils and sediments. Isotherms determined with aqueous-phase concentrations in the submicromolar range were all nonlinear and were described well by the Freundlich equation. The adsorption energies reflected a combination of hydrophobic, electrostatic, and specific chemical interactions. The results of the authors' study indicate that the properties of sorbent and solution that control adsorption are different for different classes of surfactants. The results are discussed relative to adsorption mechanisms and surfactant speciation in natural waters.

Keywords: *Surfactants, *Water pollution effects, *Adsorption, *Land pollution, *Organic compounds, Waste treatment, Industrial wastes, Consumer products, Chemical properties, Cation exchanging, Sulfur organic compounds, Oxygen organic compounds, Nitrogen organic compounds, Sorbents, Isotherms, Environmental transport, Sediments, Sediment-water interfaces, Surface reactions, Reprints.

PB92-143817/REB PC A03/MF A01
MANE: A Multiphase, Aqueous, Non-Steady State, Equilibrium Model for Simulating Soil-Water Interactions. Book chapter.
Corvallis Environmental Research Lab., OR.
R. C. Santore, and C. T. Driscoll. 10 Dec 90, 40p EPA/600/A-92/014
Pub. in Chemical Equilibrium and Reaction Models, Soil Science Society of America, Madison, WI. Prepared in cooperation with Syracuse Univ., NY. Dept. of Civil and Environmental Engineering.

A variety of chemical equilibrium models have been developed to help assess environmental chemistry problems, but few were specifically developed as research and teaching tools for use in conjunction with soil chemistry experiments. MANE model was developed to calculate equilibrium concentrations of aqueous and sorbed species, the effects of gaseous and solid phases on the composition of the aqueous and adsorbed phases, and correction of ion activities due to temperature, ionic strength and composition effects. Additionally, it was designed to compare alternative formulations for reactions between solutes and surfaces, and simulating chemical changes through a soil column over time. MANE was designed to be called as a subroutine within other models, allowing it to perform the equilibrium calculations.

Keywords: *Mathematical models, *Chemical equilibrium, *Environmental surveys, *Soil chemistry, *Land pollution, Adsorption, Environmental transport, Chemical reactions, Vapor phases, Solid phases, Comparison, Ions, Water chemistry, Phase transformations, Thermodynamics, Water pollution, *MANE model, *Soil water interactions, Multiphase Aqueous Non-steady state Equilibrium Model.

PB92-143825/REB PC A02/MF A01
Corvallis Environmental Research Lab., OR.
Modellierung und Simulation des Verhaltens von Umweltchemikalien in Boeden und Pflanzen (Modeling and Simulation of the Effect of (Environmental) Chemicals in Soil and in Plants). Symposium paper.
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.).
M. Matthies, H. Behrendt, S. Trapp, and C. McFarlane. 1992, 6p EPA/600/A-92/015
Text in German; summary in English. Pub. in Belastung von Boeden und Gewaessern, 1991. Sponsored by Corvallis Environmental Research Lab., OR.

The transport and transformation of organic chemicals in soil and plant can be assessed by a combination of laboratory and field studies with mathematical modeling taking into consideration the physical, chemical and biological processes. Simultaneous transport and transformation of herbicides (glufosinate, 2,4,5-T) in soil lysimeters and in the field can be predicted by steady-state or transient water and chemical transport models. The non-linear mineralization kinetics of metabolized organic chemicals (DEHP) depend on the concentration and the soil properties. Chemical sorption to roots can be predicted on the basis of correlation to the partitioning in n-octanol and water. Uptake and distribution of chemicals in plants is determined by a combination of partitioning, water flux and reflection at the endodermis. The results of the new plant uptake model show: hydrophilic and moderate lipophilic substances are uptaken into and translocated within plants. Very hydrophobic chemicals enter only roots. Volatile substances vaporize from soil and foliage surfaces. The variability of the environmental processes and the heterogenity of the soil structure enhance the uncertainty of model predictions under field conditions.

Keywords: *Organic compounds, *Environmental transport, *Land pollution, *Soil properties, *Plants(Botany), Herbicides, Mathematical models, Chemical properties, Biological properties, Environmental effects, Root distribution, Volatile organic compounds, Experimental design, Field tests, Kinetics, Reprints, *Foreign technology.

PB92-143833/REB PC A02/MF A01
Corvallis Environmental Research Lab., OR.
Preface and Introduction to 'The Response of Western Forests to Air Pollution'. Book chapter.
ManTech Environmental Technology, Inc., Corvallis, OR.
R. Olson, M. Boehm, and D. Brinkley. 1992, 7p EPA/600/A-92/016
Pub. in Response of Western Forest to Air Pollution, 1992. See also PB87-227641. Prepared in cooperation with Colorado State Univ., Fort Collins. Sponsored by Corvallis Environmental Research Lab., OR., and Forest Service, Washington, DC.

The book addresses the relationships between air pollution in the western United States and trends in the growth and condition of western coniferous forests. The West is defined in this case as the eleven conterminous states of California, Oregon, Washington, Idaho, Nevada, Arizona, New Mexico, Utah, Colorado, Wyoming, and Montana. The major atmospheric pollutants to which forests in this region are exposed are sulfur and nitrogen compounds and ozone. Ozone is a secondary pollutant formed by photolytic reactions involving nitrogen oxides and hydrocarbons. The potential effects of atmospheric pollution on these forests include foliar injury, alteration of growth rates and patterns, soil acidification, shifts in species composition, and modification of the effects of natural stressors.

Keywords: *Precipitation(Meteorology), *Forest trees, *Air pollution effects(Plants), Growth, Exposure, Sulfur dioxide, Nitrogen oxides, Ozone, Hydrocarbons, Environmental transport, Atmospheric circulation, Chemical reactions, Gasses, Assessments, California, Books, Washington(State), Soils, Acidification, Injuries, Stress(Physiology), *Western Region(United States), *Conifers, Acid rain.

PB92-143841/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Science Policy Interface (Chapter 12). Book chapter.
ManTech Environmental Technology, Inc., Corvallis, OR.
R. McKelvey, and S. Henderson. 1992, 26p* EPA/600/A-92/017

Pub. in Effect of Air Pollution on Biodiversity, 1992. See also PB91-171561. Prepared in cooperation with Montana Univ., Missoula. Dept. of Mathematical Sciences. Sponsored by Corvallis Environmental Research Lab., OR.

The subject of the chapter is the interplay between science, which spells out the effects of air pollution on biological diversity, and policy-making, which determines how society will respond. Specifically: How should scientists design their research--through the questions that they ask and the biotic quantities that they measure--so as best to inform the regulatory decision process, and so to advance the goal of conserving biological diversity. Scientists must be willing to propose ecological priorities. While idealized science strives for value-neutrality, ecological scientists cannot afford neutrality. Their insights and their aesthetic perceptions are essential, if society is to act wisely in resolving the biodiversity crisis.

Keywords: *Air pollution standards, *Environmental effects, *Scientists, *Government policies, Environment management, Ecology, Ecosystems, Benefit cost analysis, Value, Biological indicators, Priorities, Air pollution effects(Humans), Air pollution effects(Animals), Air pollution effects(Plants), Reprints, *Biological diversity.

PB92-143858/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Kinetics of Chemical Weathering: A Comparison of Laboratory and Field Weathering Rates (Chapter 17). Book chapter.
Iowa Univ., Iowa City. Dept. of Civil and Environmental Engineering.
J. L. Schnoor. 1990, 18p EPA/600/A-92/018
Pub. in Aquatic Chemical Kinetics: Reaction Rates of Processes in Natural Waters, p475-504 1990. Sponsored by Corvallis Environmental Research Lab., OR.

'Chemical Weathering' can be defined as the dissolution of minerals by the action of water and its solutes. It is an important feature of the global hydrogeochemical cycle of elements, whereby rocks and primary minerals become transformed to solutes and soils and, eventually, to sediments and sedimentary rocks. In the cycle, water occupies a central position serving as both a reactant and a transporting agent of suspended and dissolved material. The sea is the ultimate receptacle of weathered material, and the atmosphere provides a reservoir of weak acids (CO2) and oxidants. A comparison of laboratory weathering rates and estimates from the field indicated that laboratory rates were one to two orders of magnitude greater than field estimates of chemical weathering. The discrepancy is likely due to the difficulty of estimating a suitable wetted surface area of weatherable (reacting) minerals in the field, and the possibility of hydrologic control, due to micropore flow through soils.

Keywords: *Weathering, *Geochemistry, *Hydrogeology, *Reaction kinetics, Chemical reactions, Experimental design, Field tests, Minerals, Hydrologic cycle, Comparison, Dissolution, Sea, Study estimates, Sediments, Soil formation, Sedimentary rocks, Environmental transport, Reprints.

PB92-143866/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Polyploidy Induction as a Consequence of Topoisomerase Inhibition. A Flow Cytometric Assessment. Journal article.
ManTech Environmental Technology, Inc., Research Triangle Park, NC.
R. M. Zucker, D. J. Adams, K. W. Bair, and K. H. Elstein. cNov 91, 12p EPA/600/J-91/014
Contract EPA-68-02-4450
Pub. in Biochemical Pharmacology, v42 n11 p2199-2206 Nov 91. See also PB92-110451. Prepared in cooperation with Northrop Services, Inc., Research Triangle Park, NC., and Burroughs Wellcome Co., Research Triangle Park, NC. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

Following recovery from a 4-h exposure to clinically achievable concentrations of the topoisomerase II inhibitors Adriamycin, teniposide, or amsacrine or the putative topoisomerase II inhibitor crisnatol, murine erythroleukemic cells remained viable for up to 48 hr, but did not proliferate. Cell cycle analysis after a 24-hr recovery revealed blocks in G2 (4N DNA) or >G2 (up to 8N DNA) polyploid stages. The relative percentages of cells in either stage was a function of drug concentration and cell cycle stage at time of exposure: typically, cells exposed during S phase became blocked in G2, whereas those exposed during G2/M progressed into >G2 polyploid stages. G2-blocked cells exhibited a 2- to 3-fold increase in nuclear protein content and cellular/nuclear volume (i.e. unbalanced growth) and about 5% more DNA stainability (as a consequence of nuclear conformational changes rather than redundant DNA synthesis). In all cases, at the drug concentrations studied, mitotic figures were absent and G2 and >G2 blocks were irreversible, indicating that the mechanism of polyploidy induction differs from that of microtubule inhibitors. These findings suggest that although topoisomerase inhibitors interfere with DNA synthesis in the S phase, their induction of >G2 polyploid blocks may involve direct or indirect inhibition of chromosome condensation. (Copyright (c) 1991. Pergamon Press plc.)

Keywords: *DNA topoisomerase II, *Enzyme inhibitors, *Ploidies, Doxorubicin, Teniposide, Amsacrine, Acute erythroblastic leukemia, Cell cycle, Dose-response relationships, Deoxyribonucleic acids, Fluorescence, Mitosis, Reprints, Crisnatol.

PB92-143874/REB PC **A02**/MF **A01**
Selection Kinetics during Serial Cell Culture Passage of Mixtures of Wild-Type 'Autographa californica' Nuclear Polyhedrosis Virus and Its Recombinant Ac360-Beta-gal. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
Y. S. Huang, K. L. Bobseine, R. W. Setzer, and C. Y. Kawanishi. c1991, 10p EPA/600/J-92/015
Pub. in Jnl. of General Virology, v72 n11 p2653-2660 Nov 91. See also PB89-129084.

Detailed analysis of the selection process in serial coinfections of cell cultures by wild type Autographa californica nuclear polyhedrosis virus, AcNPV/E2, and Ac360-beta-gal, a genetically engineered strain, shows that the unaltered strain was clearly dominant even when it began as the minority component in the inoculum. A method of calculating a selection coefficient that quantifies the relative advantage of one strain of virus over the other under specific culture conditions is described. Calculated selection coefficients were relatively homogeneous and almost exclusively favored the progenitor. Selection pressure was uninfluenced by the relative proportions of the two strains in the population. Unexpected high frequencies of mixed phenotype plaques were observed during infectivity titrations of media from early serial passages of coinfected cultures. Statistical evaluation implicates some nonheritable combinational phenomenon. Virus plated from mixed phenotype plaques show high segregation of phenotypes implying that genetic recombination does not contribute in a major way to the high mixed phenotype frequencies.

Keywords: *Baculoviridae, *Genetic recombination, *Selection(Genetics), Kinetics, Cultured cells, Genetic engineering, Electron microscopy, Plaque assay, Phenotype, Virulence, Reprints, *Autographa californica.

PB92-143882/REB PC **A02**/MF **A01**
Discriminative Stimulus Properties of Triadimefon: Comparison with Methylphenidate. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
A. N. Perkins, D. A. Eckerman, and R. C. MacPhail. c1991, 7p EPA/600/J-92/016
Pub. in Pharmacology Biochemistry and Behavior, v40 n4 p757-761 Dec 91. See also PB90-146234 and PB90-217530. Prepared in cooperation with North Carolina Univ. at Chapel Hill.

Two groups of rats (N=4 each) were trained to discriminate either triadimefon (40 mg/kg) or methylphenidate (4 mg/kg) from saline in a two-lever, milk-reinforced drug discrimination paradigm. Dose response functions were determined during 5-min extinction sessions. Both agents produced a dose-related increase in the percentage of responses that occurred on the drug lever. In the substitution phase of the study, rats trained to discriminate triadimefon were tested with methylphenidate and rats trained to discriminate methylphenidate were tested with triadimefon. Triadimefon substituted completely for methylphenidate and methylphenidate substituted completely for triadimefon. The results indicate that triadimefon can function as a discriminative stimulus and that it shares discriminative stimulus properties with methylphenidate.

Keywords: *Fungicides, *Methylphenidate, *Discrimination learning, Comparison, Rats, Dose-response relationships, Sodium chloride, Reprints, *Triadimefon.

PB92-143890/REB PC **A02**/MF **A01**
Auditory Deficits and Motor Dysfunction Following Iminodipropionitrile Administration in the Rat. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
K. M. Crofton, and T. Knight. c1991, 9p EPA/600/J-92/017
Pub. in Neurotoxicology and Teratology, v13 n6 p575-581 Nov 91. See also PB91-145078. Prepared in cooperation with North Carolina Central Univ., Durham. Dept. of Biology.

The behavioral effects of 3,3'-iminodipropionitrile (IDPN) were studied using reflex modification of the acoustic startle response and figure-eight maze activity. A number of experiments were conducted with separate groups of adult male Long-Evans hooded rats exposed to saline or 50-500 mg/kg IDPN for 3 consecutive days. Auditory thresholds (reflex modification), motor activity, and grip strength were measured 1 day, and 1, 3, and 9 weeks postdosing. Reflex inhibition was monitored daily, prior to, during, and for 7 days following exposure. Auditory thresholds for 5- and 40-kHz tones were elevated approximately 25 dB and 50 dB, respectively. The onset of the auditory dysfunction in the 200-mg/kg/day group, as demonstrated by a loss of reflex inhibition, was 2 days for the 40-kHz tone and 4 days for the 5-kHz tone. Motor activity was increased up to 400% in the 200-mg/kg group, whereas there was no alteration in hindlimb grip strength. These data demonstrate dosage- and time-dependent alterations in auditory and motor function following IDPN exposure.

Keywords: *Animal behavior, *Audiometry, *Motor activity, *Toxicology, Startle reaction, Reflexes, Dose-response relationships, Body weight, Reprints, *Iminodipropionitriles.

PB92-143908/REB PC **A03**/MF **A01**
Health Effects Research Lab., Research Triangle Park, NC.
Influence of Chlordimeform on Alpha-Adrenergic Receptor-Associated Mechanisms of Hormonal Regulation in the Rat: Pituitary and Adrenocortical Secretion. Journal article.
ManTech Environmental Technology, Inc., Research Triangle Park, NC.
T. E. Stoker, J. M. Goldman, R. L. Cooper, and W. K. McElroy. c1991, 14p EPA/600/J-92/018
Contract EPA-68-02-4450
Pub. in Toxicology, v69 n3 p257-268 Nov 91. See also PB91-200303. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

The acaricide chlordimeform (CDF) has been reported to have effects on the central nervous system that appear to involve an interaction with alpha-adrenergic receptor-mediated mechanisms of neurotransmission. The present study examined the influence of CDF on pituitary-adrenocortical hormonal secretion, since there is a well-established alpha-adrenoceptor component to this activity. Effects on prolactin (PRL) were also evaluated, as its release is often concurrent with adrenocortical hormonal secretion and may involve an adrenergic contribution. CDF-injected (20 or 50mg/kg) male Long-Evans rats were killed after 1,4,8 or 24 hrs. Both non-injected and saline-injected controls were included. Dosing was structured so that trunk blood could be collected during the morning nadir of circulating corticosterone (CORT). Plasma adrenocorticotropic hormone (ACTH), CORT, and PRL all increased sharply by 1 hr following 50 mg/kg CDF. CORT increased in a dose-dependent fashion and declined over the ensuing 8 hrs. Separate groups of animals were also pre-treated with the alpha-adrenoceptor antagonist phenoxybenzamine (PBZ, 20mg/kg) or the alpha-receptor agonist clonidine (CLON, 0.6mg/kg) 40 min before and killed 1 hr after CDF (25mg/kg) injection.

Keywords: *Chlorophenamidine, *Toxicology, *Alpha adrenergic receptors, *Adrenal cortex hormones, *Pituitary hormones, Dose-response relationships, Corti-

cotropin, Prolactin, Corticosterone, Clonidine, Phenoxybenzamine, Dexamethasone, Reprints.

PB92-143916/REB PC A03/MF A01
Interlaboratory Comparison of Motor Activity Experiments: Implications for Neurotoxicological Assessments. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
K. M. Crofton, J. L. Howard, V. C. Moser, M. W. Gill, and L. W. Reiter. c1991, 13p EPA/600/J-92/019
Pub. in Neurotoxicology and Teratology, v13 n6 p599-609 Nov 91. Prepared in cooperation with Burroughs Wellcome Co., Research Triangle Park, NC., National Inst. of Environmental Health Sciences, Research Triangle Park, NC. Lab. of Molecular and Integrative Neuroscience, Northrop Services, Inc., Research Triangle Park, NC., and Mellon Inst.-Union Carbide Corp., Export, PA. Bushy Run Research Cente

Due to the increasing use of motor activity in neurotoxicology, a major question concerns the potential for differences in experimental findings due to variations in sensitivity and reliability between different laboratories and devices used to measure motor activity. The study addressed the question by examining historical data from a number of laboratories that employed different devices and experimental protocols to measure motor activity. Four aspects of the motor activity data were compared: (1) within laboratory control variability; (2) within laboratory replicability of control data; (3) between laboratory variability in the effects of chemicals; and (4) between laboratory comparison of the control rates of habituation. The analyses indicated that there was a relatively restricted range of within-laboratory variability and reliability in control values, and that these ranges were comparable across laboratories. Similar profiles of habituation were also seen across the different laboratories. Moreover, in virtually every case all laboratories were capable of detecting qualitatively similar changes in motor activity following acute exposure to a variety of chemicals. These data indicate a high degree of comparability in the data generated by the different devices and experimental protocols.

Keywords: *Toxicity, *Nervous system, *Interlaboratory comparisons, *Motor activity, Risk assessment, Rats, Dose-response relationships, Amphetamines, Scopolamine, Carbaryl, Chlorpromazine, Endosulfan, Physostigmine, Reprints, Habituation, Triadimefon, Cypermethrin, Methylscopolamine.

PB92-143924/REB PC A01/MF A01
5,7-Dihydroxytryptamine Injections Increase Glial Fibrillary Acidic Protein in the Hypothalamus of Adult Rats. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
M. Frankfurt, J. O'Callaghan, and A. Beaudet. c1991, 5p EPA/600/J-91/020
Pub. in Brain Research, v549 n1 p138-140 May 91. See also PB91-117077. Prepared in cooperation with Rockefeller Univ., New York. Lab. of Neuroendocrinology, and Montreal Neurological Inst. (Quebec). Neuroanatomy Lab.

The distribution and level of glial fibrillary acidic protein (GFAP) were determined in the adult rat hypothalamus following axotomy of serotonin (5-HT) neurons. Seven days after unilateral intrahypothalamic injection of the 5-HT neurotoxic, 5,7-dihydroxytryptamine, there was a marked increase in the number of GFAP-labelled astrocytes in the ipsilateral hypothalamus of 5,7-DHT-treated as compared to sham-treated rats. Measurement of GFAP levels demonstrated a significant increase on the ipsilateral side of 5,7-DHT-treated rats as compared to sham-treated rats.

Keywords: *Glial fibrillary acidic protein, *Hypothalamus, *5-7-dihydroxytryptamine, Rats, Astrocytes, Serotonin, Radioimmunoessay, Immunohistochemistry, Reprints.

PB92-143932/REB PC A02/MF A01
Effects of Triadimefon on a Multiple Schedule of Fixed-Interval Performance: Comparison with Methylphenidate, d-Amphetamine and Chlorpromazine. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
A. R. Allen, and R. C. MacPhail. c1991, 8p EPA/600/J-92/021
Pub. in Pharmacology Biochemistry and Behavior, v40 n4 p775-780 Dec 91. See also PB89-109888. Prepared in cooperation with North Carolina Univ. at Chapel Hill.

The experiment was designed to compare triadimefon to known psychomotor stimulants. Four rats were trained to perform under a mult FI 1-min FI 5-min schedule of milk reinforcement. They then received a series of dosages of triadimefon (10-170 mg/kg, i.p.) and of methylphenidate (1-17.3 mg/kg, i.p.) in a counterbalanced order. Certain dosages of triadimefon increased response rates for all rats in the FI 1-min component and in the FI 5-min component. Methylphenidate increased response rates in each component for only two rats. Temporal patterns of responding were disrupted more in the FI 5-min component than in the FI 1-min component by both triadimefon and methylphenidate. Performances were then evaluated following a series of dosages of d-amphetamine (0.3-3.0 mg/kg, i.p.) and chlorpromazine (0.5-2.0 mg/kg, i.p.). Response rates in FI 1-min were increased by d-amphetamine for three rats and in FI 5-min for two rats. d-Amphetamine, like triadimefon and methylphenidate, produced a greater disruption of response patterning in FI 5-min than in FI 1-min. Chlorpromazine only decreased response rates, but also produced some disruption in FI 5-min response patterning.

Keywords: *Fungicides, *Toxicity, *Psychomotor performance, *Methylphenidate, *Amphetamines, *Chlorpromazine, Comparison, Rats, Motor activity, Dose-response relationships, Reprints, *Triadimefon.

PB92-143940/REB PC A02/MF A01
Serial Spatial Reversal Learning in Rats: Comparison of Instrumental and Automaintenance Procedures. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
P. J. Bushnell, and M. E. Stanton. c1991, 9p EPA/600/J-92/022
Pub. in Physiology and Behavior, v50 n6 p1145-1151 Dec 91. See also PB89-236293.

Serial reversals of a spatial discrimination were trained in rats under automaintenance conditions, in which food reward occurred regardless of responding. The automaintained reversal learning was compared to instrumental reversal learning in other rats trained under a similar procedure which required responding for reward. In the automaintenance (AU) procedure, rats received food after every retraction of a 'positive' response lever (S(sup +); retraction of a second, neutral lever S(Sup 0) was not paired with food delivery. A second group of rats was trained on a similar instrumental schedule, in whi ch at least one response to the S(sup +) was required for food delivery. Response rates in the instrumental (IN) group were approximately double those of the AU group. However, ratios of S(sup +) to S(sup 0) response rates were similar to those of the AU group, and the serial reversal curves generated were qualitatively similar. Thus rats can show improvement across serial reversals of a spatial discrimination based entirely on pairings of stimulus events (automaintenance), in a manner similar to that observed in instrumental procedures, in which reward is contingent upon correct responding.

Keywords: *Reversal learning, *Instrumental conditioning, Rats, Comparison, Discrimination(Psychology), Graphs(Charts), Analysis of variance, Statistical analysis, Reprints, *Automaintenance.

PB92-143957/REB PC A03/MF A01
Gene Probe for PO Messenger RNA Used to Index Acrylamide Toxic Neuropathy in Rats. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Neurotoxicology Div.
B. Veronesi, K. Jones, S. Gupta, J. Pringle, and C. Mezei. c1991, 20p EPA/600/J-92/023
Pub. in Neurotoxicology, v12 n4 p715-732 Dec 91. Prepared in cooperation with Dalhousie Univ., Halifax (Nova Scotia). Dept. of Biochemistry.

Cumulative exposure to the neurotoxicant acrylamide produces axonal damage in the distal ends of both central (CNS) and peripheral (PNS) nerve fibers and subsequent hind-limb paralysis. The messenger RNA which codes for the PNS myelin glycoprotein PO(PO-mRNA) was used to monitor this toxic neuropathy in Sprague Dawley rats prior to, concurrent with, and subsequent to, ultrastructurally and immunocytochemically defined nerve damage. Rats were dosed every other day with acrylamide (50 mg/kg, IP) and sampled intermittently throughout a 4 week exposure period. Slot blot and Northern gel analyses of the proximal and distal sciatic nerve were used to determine a quantitated measure of PO-mRNA. Results suggest that changes in neural specific mRNAs are sensitive to neurotoxic damage and can be used to monitor the pathogenesis of nerve degeneration.

Keywords: *Toxicity, *Acrylamides, *Messenger RNA, *DNA probes, *Nervous system, Immunohistochemistry, Myelin proteins, Glycoproteins, Northern blotting, Electron microscopy, Genetic transcription, Axons, Reprints.

PB92-143965/REB PC A03/MF A01
Interspecies Comparisons of A/D Ratios: A/D Ratios Are Not Constant Across Species. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
G. P. Daston, J. M. Rogers, D. J. Versteeg, T. D. Sabourin, and D. Baines. c1991, 29p EPA/600/J-92/024
Pub. in Fundamental and Applied Toxicology, v17 n4 p696-722 Nov 91. Prepared in cooperation with Procter and Gamble Co., Cincinnati, OH. Human and Environmental Safety Div., and Battelle, Columbus, OH.

The hypothesis that the ratio of the adult (A) and developmental (D) toxicity of a chemical is constant across animal species has been proposed as the basis for identifying developmental hazards, both from traditional developmental toxicity screens using laboratory mammals and from alternative systems such as the coelenterate Hydra attenuata. The purpose of the study was to determine whether A/D ratios are constant across species. The developmental and adult toxicity of 14 chemicals was assessed in four phylogenetically different species. The chemicals tested were aminopterin, bromodeoxyuridine, cadmium chloride, caffeine, congo red, dinocap, dinoseb, diphenylhydantoin, epinephrine, ethylenethiourea, 2-methoxyethanol, mirex, all-trans-retinoic acid, and trypan blue. Data indicate that A/D ratios are not constant across these representative species, and there is no basis for using A/D for hazard assessment.

Keywords: *Toxicity, *Teratogens, *Species specificity, Invertebrates, Laboratory animals, Lethal dosage, Toxic substances, Tables(Data), Amphibia, Reprints.

PB92-143973/REB PC A01/MF A01
Generation of Recombinant Baculovirus via Liposome-Mediated Transfection. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
P. Hartig, M. Cardon, and C. Kawanishi. c1991, 5p EPA/600/J-92/025
Pub. in BioTechniques, v11 n3 p310-313 Sep 91.

Baculovirus expression vectors have become a popular method of producing recombinant proteins. Production of recombinant virus requires the transfection of both the native viral DNA and a transfer plasmid into insect cells where recombination takes place. While several methods of transfecting insect cells exist, the authors have found liposome mediated transfection to be the most efficient. The document details the protocols and medium needed for efficient simple transfection of Spodoptera frugiperda cells.

Keywords: *Baculoviridae, *Genetic recombination, *Liposomes, *Transfection, Genetic vectors, Viral DNA, Plasmids, Recombinant proteins, Post-translational protein processing, Calcium phosphates, Reprints, Spodoptera frugiperda.

PB92-143981/REB PC A02/MF A01
Effects of pH, Solid/Solution Ratio, Ionic Strength, and Organic Acids on Pb and Cd Sorption on Kaolinite. Journal article.
Robert S. Kerr Environmental Research Lab., Ada, OK.
R. W. Puls, R. M. Powell, D. Clark, and C. J. Eldred. c1991, 10p EPA/600/J-92/026
Pub. in Water, Air, and Soil Pollution 57-58, p423-430 1991. Prepared in cooperation with NSI Technology Services Corp., Ada, OK.

Potentiometric and ion-selective electrode titrations together with batch sorption/desorption experiments, were performed to explain the aqueous and surface complexation reactions between kaolinite, Pb, Cd and organic acids. Variables included pH, ionic strength, metal concentration, kaolinite concentration and time. The organic acids used were p-hydroxybenzoic acid, o-toluic acid, and 2,4-dinitrophenol. Titrations were used to derive previously unavailable aqueous conditional stability constants for the organometallic complexes. Batch results showed that aqueous lead-organic complexation reduced sorption of Pb by kaolinite. Cadmium behavior was similar, except for 2,4-dinitrophenol, where Cd sorption was increased. Metal sorption increased with increasing pH and decreasing ionic strength. Distribution ratios (K(sub d)'s) decreased with increasing solid/solution ratio. The subsurface transport of lead and cadmium may be enhanced via complex interactions with organic wastes or their degradation products and sorbent mineral surfaces. (Copyright (c) 1991 Kluwer Academic Publishers.)

Keywords: *Waste disposal, *Metals, *Organic compounds, *Sorption, *Kaolinite, *Environmental transport, Chemical properties, Surface chemistry, Lead(Metal), Cadmium, Complex compounds, pH, Desorption, Ions, Volumetric analysis, Potentiometric analysis, Reprints.

PB92-143999/REB PC **A03/MF A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Prediction of the Solubility of Hydrophobic Compounds in Nonideal Solvent Mixtures. Journal article.
ROCOM, Montclair, NJ.
R. Pinal, L. S. Lee, and P. S. C. Rao. c1991, 15p EPA/600/J-92/027
Grant EPA-R-814512
Pub. in Chemosphere, v22 n9-10 p939-951 1991. Prepared in cooperation with Florida Univ., Gainesville. Dept. of Soil Science. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

The solubility of hydrophobic organic chemicals (HOCs) in partially-miscible solvent mixtures was investigated. In agreement with previous findings, it was observed that there is a limited domain in which nonideality effects are important; appreciable concentrations of partially-miscible (with water) organic solvents are required in order to observe significant effects on solubility. Deviations from the log-linear cosolvency model were attributed to solvent-solvent interactions, and hence quantified by the degree of nonideality of the solvent mixture. An expression was proposed for estimating the deviations from the log-linear model. For each solvent component, a nonideality term closely related to its partial excess free energy of mixing was added to the log-linear model. Predictions of solubility in binary and ternary solvent mixtures were in good agreement with experimental data. Deviations from the log-linear model were attributed to solvent nonideality which implies that there is no fundamental or mechanistic difference between the cosolvencies of partially- and completely- miscible solvents. The observed differences in cosolvencies are only in magnitude, which results from a combination of the degree of nonideality of the mixture (activity coefficients) and concentrations of the components. Examples of the application of the proposed expression are presented.

Keywords: *Aromatic polycyclic hydrocarbons, *Solubility, *Organic solvents, Mixtures, Sorption, Gibbs free energy, Mathematical models, Reprints, *Hydrophobic organic chemicals, *Nonideal solvent mixtures, Cosolvency.

PB92-144005/REB PC **A03/MF A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Biotransformation of Monoaromatic and Chlorinated Hydrocarbons at an Aviation Gasoline Spill Site. Journal article Jun 86-Oct 91.
Dynamac Corp., Ada, OK.
B. H. Wilson, J. T. Wilson, D. H. Kampbell, B. E. Bledsoe, and J. M. Armstrong. c1991, 18p EPA/600/J-92/028
Grant EPA-R-812808
Pub. in Geomicrobiology Jnl., v8 p225-240 1990. See also PB83-201798. Prepared in cooperation with Traverse Group, Inc., Ann Arbor, MI. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

Loss of petroleum products from underground storage tanks, pipelines, and accidental spills are major sources of contamination of unsaturated soils, aquifer solids, and a shallow water table aquifer under the U.S. Coast Guard Air Station at Traverse City, MI, has acclimated to the aerobic and anaerobic transformation of monoaromatic hydrocarbons (BTX) released from an aviation gasoline spill. The aquifer also exhibits reductive dechlorination of a chlorinated solvent spill adjacent to the aviation gasoline spill. The groundwater is buffered near neutrality. The aviation gasoline plume is methanogenic and the aquifer contains enough iron minerals to support significant iron solubilization. Field evidence of both aerobic and anaerobic biotransformation of monoaromatics was confirmed by laboratory studies of aquifer material obtained from the site. In the laboratory studies, the removal of the monoaromatics in the anaerobic material was rapid and compared favorable with removal in the aerobic material. The kinetics of anaerobic removal of monoaromatics in the laboratory were similar to the kinetics at field scale in the aquifer. Biotransformation of the chlorinated solvents was not observed until late in the study, when daughter products from reductive dechlorination of the chlorinated solvents were identified by GC/MS.

Keywords: *Oil pollution, *Chemical spills, *Biodeterioration, *Land pollution, *Water pollution control, Dechlorination, Aromatic compounds, Aviation gasoline, Reaction kinetics, Chlorine organic compounds, Ground water, Oil spills, Aquifers, Anaerobic processes, Aerobic processes, Underground storage, Storage tanks, Reprints.

PB92-144013/REB PC **A03/MF A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Evaluation of Hydraulic Conductivities Calculated from Multiport-Permeameter Measurements. Journal article.
ENSR, Acton, MA.
S. H. Wolf, M. A. Celia, and K. M. Hess. c1991, 13p EPA/600/J-92/029
Pub. in Ground Water, v29 n4 Jul/Aug 91. Prepared in cooperation with Princeton Univ., NJ. Dept. of Civil Engineering, and Geological Survey, Marlborough, MA. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK., and Massachusetts Inst. of Tech., Cambridge.

A multiport permeameter was developed for use in estimating hydraulic conductivity over intact sections of aquifer core using the core liner as the permeameter body. Six cores obtained from one borehole through the upper 9 m of a stratified glacial-outwash aquifer were used to evaluate the reliability of the permeameter. Radiographs of the cores were used to assess core integrity and to locate 5- to 10-cm sections of similar grain size for estimation of hydraulic conductivity. After extensive testing of the permeameter, hydraulic conductivities were determined for 83 sections of the six cores. Other measurement techniques included permeameter measurements on repacked sections of core, estimates based on grain-size analyses, and estimates based on borehole flowmeter measurements. Hydraulic conductivities calculated from field measurements, using a borehole flowmeter in the borehole from which the cores were extracted, were significantly higher than those calculated from laboratory measurements and more closely agreed with independent estimates of hydraulic conductivity based on tracer movement near the borehole. This indicates that hydraulic conductivities based on laboratory measurements of core samples may underestimate actual field hydraulic conductivities in this type of stratified glacial-outwash aquifer.

Keywords: *Aquifers, *Permeameters, *Hydraulic conductivity, Hydrogeology, Ground water, Flow measurement, Permeability, Flowmeters, Boreholes, Radiography, Mathematical models, Reprints.

PB92-144021/REB PC **A02/MF A01**
Control of Aromatic Waste Air Streams by Soil Bioreactors. Journal article Oct 86-Sep 89.
Robert S. Kerr Environmental Research Lab., Ada, OK.
D. E. Miller, and L. W. Canter. c1991, 9p EPA/600/J-92/030
Pub. in Environmental Progress, v10 n4 p300-306 Nov 91. Prepared in cooperation with Oklahoma Univ., Norman. Environmental and Ground Water Inst.

Contamination of groundwater resources is a serious environmental problem which is continuing to increase in occurrence in the United States. It has been reported that leaking underground gasoline storage tanks may pose the most serious threat of all sources of groundwater contamination. Gasolines are comprised of a variety of aliphatic and aromatic hydrocarbons. The aromatic portion consists primarily of benzene, toluene, ethylbenzene, and xylenes (BTEX compounds). BTEX compounds are also among the most frequency identified substances at Superfund sites. Pump and treat well systems are the most common and frequently used technique for aquifer restoration. Treatment is often in the form of air stripping to remove the volatile components from the contaminated water. Additionally, soil ventilation processes have been used to remove volatile components from the vadose zone. Both air stripping and soil ventilation produce a waste gas stream containing volatile compounds which is normally treated by carbon adsorption or incineration. Both treatment processes require a substantial capital investment and continual operation and maintenance expenditures. The objective of the study was to examine the potential of using soil bioreactors to treat a waste gas stream produced by air stripping or soil ventilation process. Previous studies have shown that various hydrocarbons can be successfully treated with soils. The study examined the removal of BTEX compounds within soil columns and the influence of soil type, inlet concentration, and inlet flow rate on the removal efficiency.

Keywords: *Soil treatment, *Land pollution control, *Water pollution control, *Biodegradation, *Aromatic compounds, Microbial degradation, Biological treatment, Storage tanks, Underground storage, Gasoline, Ground water, Aquifers, Waste disposal, Superfund, Stripping, Volatile organic compounds, Reprints, Soil venting.

PB92-144039/REB PC **A02/MF A01**
Ozone Decreases Spring Root Growth and Root Carbohydrate Content in Ponderosa Pine the Year Following Exposure. Journal article.
Corvallis Environmental Research Lab., OR.
C. P. Andersen, W. E. Hogsett, R. Wessling, and M. Plocher. c1991, 6p EPA/600/J-92/031
Pub. in Canadian Jnl. of Forest Research, v21 p1288-1291 1991. Prepared in cooperation with NSI Technology Services Corp., Corvallis, OR.

Storage carbohydrates are extremely important for new shoot and root development following dormancy or during periods of high stress. The hypothesis that ozone decreases carbohydrate storage and decreases new root growth during the year following exposure was investigated. The results suggest that (1) ponderosa pine seedlings exposed to 122 and 169 ppm hrs ozone for one season have significantly less root starch reserves available just prior to and during bud break the following year, and (2) spring root growth is decreased following ozone exposure. The carry-over effects of ozone stress may be important in long-lived perennial species which are annually subjected to ozone.

Keywords: *Ozone, *Air pollution effects(Plants), *Pine trees, *Root development, *Carbohydrates, Plant physiology, Exposure, Seedlings, Seasonal variations, Period of growth, Plant growth, Reprints.

PB92-144047/REB PC **A03/MF A01**
Diurnal Water Relations of Walnut Trees: Implications for Remote Sensing. Journal article.
Corvallis Environmental Research Lab., OR.
J. A. Weber, and S. L. Ustin. c1991, 13p EPA/600/J-92/032
Pub. in IEEE Transactions on Geoscience and Remote Sensing, v29 n6 p864-874 Nov 91. See also N89-18704. Prepared in cooperation with California Univ., Davis.

Leaf water content (LWC), relative water content (RWC) and water potential (LWP) were measured as indicators of diurnal change in tree water status in an experimental walnut orchard receiving two irrigation treatments: 100% and 33% of potential evapotranspiration (PET). LWP had the greatest magnitude of diurnal change throughout the experimental period with minima occurring each day in early to mid-afternoon and maxima between midnight and sunrise. The temporal discrepancy could be caused by cavitation of xylem elements in the vicinity of the DC (Dielectric

Constants) probe. Microwave backscatter for L- and X-bands also measured diurnal variation that had local minima in the afternoon, but the pattern among wavelength and polarization signatures was complex. From these data it appears that radar backscatter can respond to diurnal changes in plant water status. Interpretation of diurnal patterns using a satellite sensor will require models that account for multiple sources of canopy and soil variance, including canopy architecture and soil moisture and more precise understanding of the basis of diurnal patterns in backscatter.

Keywords: *Remote sensing, *Trees(Botany), *Moisture content, *Leaves, Irrigation systems, Hardwoods, Dielectric constants, Comparison, Diurnal distribution, Soil moisture, Canopy, Vegetation establishment, Forests, Evapotranspiration, Reprints, *Walnut trees.

PB92-144054/REB PC A03/MF A01
Stress Interactions and Mycorrhizal Plant Response: Understanding Carbon Allocation Priorities. Journal article.
Corvallis Environmental Research Lab., OR.
C. P. Andersen, and P. T. Rygiewicz. c1991, 30p EPA/600/J-92/033
Pub. in Environmental Pollution 73, p217-244 1991.

The paper presents a framework for studying responses of mycorrhizal roots to external stresses, including possible feedback effects, which are likely to occur. A conceptual model is presented to discuss how carbon may be involved in singular and multiple stress interactions of mycorrhizal seedlings. Recent literature linking carbon allocation and host/fungal response under natural and anthropogenic stresses is reviewed. Due to its integral role in metabolic processes, characterizing carbon and carbon allocation in controlled laboratory environments could be useful for understanding host/fungal responses to a variety of natural and anthropogenic stresses. Carbon allocation at the whole plant level reflects an integrated response which links photosynthesis to growth and maintenance processes. A root-mycocosm system is described which permits spatial separation of a portion of extramatrical hyphae growing in association with seedling roots. The results are presented in a fashion to illustrate the nature of information which can be obtained using this system. Current projects using the mycocosms include characterizing the dynamics of carbon allocation under ozone stress, and following the fate of organic pollutants. The authors believe that the system could be used to differentiate fungal and host mediated responses to a large number of other stresses, and to study a variety of physiological processes in mycorrhizal plants.

Keywords: *Soil-water-plant relationships, *Plant physiology, *Land pollution, *Carbon cycle, *Stress, Seedlings, Environmental effects, Acid rain, Pollutants, Root distribution, Plant diseases, Fungi, Experimental design, Nutrients, Reprints, *Mycorrhizal plants.

PB92-144062/REB PC A02/MF A01
Possible Approaches to Establishing Interlaboratory Comparability of Measurements of Polychlorinated Biphenyls in Human Serum. Journal article.
Corvallis Environmental Research Lab., OR.
V. W. Burse, M. P. Korver, D. L. Phillips, P. C. McClure, and S. P. Caudill. c1991, 10p EPA/600/J-92/034
Pub. in Analytica Chimica Acta 251, p281-289 1991. Prepared in cooperation with Centers for Disease Control, Atlanta, GA. Center for Environmental Health and Injury Control, and Massachusetts Dept. of Public Health, Boston. Center for Labs. and Communicable Disease Control.

The Massachusetts Department of Public Health, with the assistance of the Centers for Disease Control, conducted a study to determine the prevalence of elevated levels (> 30 ng/ml) of polychlorinated biphenyls (PCBs) in serum taken from residents of the greater New Bedford area in Massachusetts. The criteria and procedures used to establish interlaboratory comparability for measurements for PCBs in human serum, the establishment and performance of the quality control system and the comparability of results on human serum samples from the New Bedford study are described. Aspects of interlaboratory comparability addressed include the establishment of common extraction and analytical methods, joint analyses of bovine serum pools (both in vitro-spiked pools and in vivo pools from a cow that was fed PCBs), establishment of quality control charts and rules for acceptability of analytical runs and joint analyses of a subset (n = 207) of the human serum samples from the New Bedford study. The 207 jointly analyzed samples had PCB levels that ranged from 1 to 214 ng/ml and had an interlaboratory correlation coefficient of 0.96.

Keywords: *Interlaboratory comparisons, *Blood, *Polychlorinated biphenyl compounds, *Clinical chemistry, Pesticides, Gas chromatography, Quality control, Cattle, In vivo analysis, In vitro analysis, Reprints.

PB92-144070/REB PC A02/MF A01
Corvallis Environmental Research Lab., OR.
Slowing the Increase of Atmospheric Carbon Dioxide: A Biological Approach. Journal article.
NSI Technology Services Corp., Corvallis, OR.
P. Schroeder, and L. Ladd. c1991, 10p EPA/600/J-92/035
Contract EPA-68-C8-0006
Pub. in Climatic Change v19, p283-290 1991. Sponsored by Corvallis Environmental Research Lab., OR.

Planting trees to act as carbon sinks has been suggested as a way to slow the increase of atmospheric CO2. Forestry growth and yield models were used to estimate that it would take 192 million hectares of Douglas-fir (Pseudotsuga menziesii) or 250 million hectares of Loblolly pine (Pinus taeda) to capture and store the United States' anthropogenic carbon emissions for an assumed period of 50 yr, at current emission rates. Although maximum growth rates are similar for both species, Douglas-fir requires less area because of its greater ability to store carbon, and its ability to maintain a high growth rate for a longer period of time. The usefulness of a particular species also depends in part on the length of the planning horizon and the forestry project. For periods of 50 or more years, it is important to consider a species' cumulative carbon storage potential rather than its potential maximum growth rate at some point during its life cycle. Forestation (reforestation and afforestation) appears to be feasible as a possible component of a comprehensive strategy for managing the CO2 problem, but it must be practiced globally to be effective. (Copyright (c) 1991 Kluwer Academic Publishers.)

Keywords: *Air pollution control, *Carbon dioxide, *Sinks, *Trees(Botany), Forestry, Pine trees, Plant growth, Environmental management, Global aspects, Douglas fir trees, Carbon cycle, Reforestation, Afforestation, Reprints.

PB92-144088/REB PC A03/MF A01
Statistical Methodology for Exploring Elevational Differences in Precipitation Chemistry. Journal article.
Environmental Protection Agency, Denver, CO. Region VIII.
W. G. Warren, M. Boehm, and D. Link. c1992, 12p EPA/600/J-92/036
Pub. in Atmospheric Environment, v26A n1 p159-169 1992. Prepared in cooperation with Oregon State Univ., Corvallis. Dept. of Forest Management, and NSI Technology Services Corp., Corvallis, OR. Environmental Research Lab.

A statistical methodology for exploring the relationships between elevation and precipitation chemistry is outlined and illustrated. The methodology utilizes maximum likelihood estimates and likelihood ratio tests with contour ellipses of assumed bivariate lognormal distributions used to assist in interpretation. The approach was illustrated using 12 NADP/NTN sites located in six study areas in the Wyoming and Colorado Rockies. These sites are part of the Rocky Mountain Deposition Monitoring Project (RMDMP), which was initiated in 1986 to investigate the relationships between elevation and the chemistry of precipitation. The results indicate differences in sulfate concentrations between airsheds, between snow and rain, and between higher and lower elevations. In general, sulfate concentrations in snow are greater at lower elevations and this difference is independent of concentration. A similar relationship for rain was not well established. In addition there is evidence that, overall, the sulfate concentrations differed between the six study areas, although pairwise differences were not always significant.

Keywords: *Precipitation(Meteorology), *Statistical analysis, *Atmospheric chemistry, *Air pollution, Study estimates, Concentration(Composition), Elevation, Techniques, Sulfates, Snow, Rain, Reprints, National Atmospheric Deposition Program, National Trends Network.

PB92-145358/REB PC A11/MF A03
Environmental Protection Agency, Research Triangle Park, NC. Control Technology Center.
Burning Tires for Fuel and Tire Pyrolysis: Air Implications.
Pacific Environmental Services, Inc., Durham, NC.
C. Clark, K. Meardon, and D. Russell. Dec 91, 234p EPA/450/3-91/024
Contract EPA-68-D-00124
See also DE84003924, PB90-126004 and PB92-115252. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Control Technology Center.

The document was developed in response to increasing inquiries into the environmental impacts of burning waste tires in process equipment. The document provides information on the use of whole, scrap tires and tire-derived-fuel (TDF) as combustion fuel and on the pyrolysis of scrap tires. The use of whole tires and TDF as a primary fuel is discussed for dedicated tire-to-energy facilities. The use of whole tires and TDF as a supplemental fuel is discussed for cement manufacturing plants, electric utilities, pulp and paper mills, and other industrial processes. The focus of the document is on the impact of burning whole tires and TDF on air emissions. Test data are presented and, in most instances, compared with emissions under baseline conditions (no tires or TDF in the fuel). The control devices used in these industries are discussed and, where possible, their effectiveness in controlling emissions from the burning of whole tires or TDF is described. In addition, the report provides information on the processes themselves that use whole tires or TDF, the modifications to the processes that allowed the use of whole tires or TDF, and the operational experiences of several facilities using whole tires or TDF. The economic feasibility of using whole tires and TDF for the surveyed industries is discussed. Finally, contacts for State waste tire programs are presented.

Keywords: *Air pollution control, *Refuse derived fuels, *Solid waste disposal, Tires, Pyrolysis, Environmental effects, Air pollution control equipment, Combustion products, Boilers, Energy sources, Portland cement, Paper industry, Electric utilities, Industrial plants, *Waste tires, Scrap tires.

PB92-145366/REB PC A13
Environmental Protection Agency, Washington, DC.
Distribution of Submerged Aquatic Vegetation in the Chesapeake Bay and Tributaries and Chincoteague Bay - 1990. Final rept.
Virginia Inst. of Marine Science, Gloucester Point.
R. J. Orth, J. F. Nowak, A. A. Frisch, K. P. Kiley, and J. R. Whiting. Sep 91, 280p
Grants EPA-X00346502-0, NOAA-NA90AA-H-CZ796
See also PB80-140726 and PB89-184683.Portions of this document are not fully legible. Prepared in cooperation with Virginia Council on the Environment, Richmond. Sponsored by Environmental Protection Agency, Washington, DC., National Oceanic and Atmospheric Administration, Rockville, MD., and Maryland Dept. of Natural Resources, Annapolis.

The report documents the distribution of submerged aquatic vegetation (SAV), principally rooted vascular macrophytes, in the Chesapeake Bay, its tributaries, and Chincoteague Bay mapped during May to October 1990 at a scale of 1:24,000 using black and white aerial photography. SAV bed perimeter information was digitized and stored in a computerized data base. SAV in Chincoteague Bay increased slightly in distribution from 1989, with 2,494 hectares mapped in 1990. All of the SAV consisted of R. maritima and Z. marina, and was located along the eastern side of the bay behind Assateague Island.

Keywords: *Aquatic plants, *Chesapeake Bay, Spatial distribution, Species diversity, Maps, Drawings, Aerial photography, Tables(Data), *Submerged aquatic vegetation.

PB92-145382/REB PC A06/MF A02
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
User's Guide for the Urban Airshed Model. Volume 6. User's Manual for the Postprocessing System.
Computer Sciences Corp., Research Triangle Park, NC.
A. Alexander, V. DelGobbo, B. Goodrich, and C. Maxwell. Nov 91, 114p EPA/450/4-90/007F

Contract EPA-68-01-7365
See also PB91-131268 and PB91-505578. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The UAM Postprocessing System (UAMPPS) is a data display and analysis tool for evaluating emission control strategies. After executing the UAM system the results from one or more model runs may be graphically compared. The UAMPPS creates time series plots, tile maps, bar charts, boxplots, scatter plots and quantile plots. Through a series of menus the user has a wide range of flexibility in scaling and labeling the graphs.

Keywords: *Atmospheric chemistry, *User manuals(Computer programs), *Air pollution control, *Computer graphics, *Environmental policy, Guidelines, Computer techniques, Time series analysis, Display devices, Statistical analysis, Temporal distribution, Air pollution abatement, Spatial distribution, Input/output routines, Computerized simulation, Graphs(Charts), Concentration(Composition), *Urban Airshed Model, *UAM Postprocessing System.

PB92-145390/REB PC **A04/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Enhanced Ozone Monitoring Network Design and Siting Criteria Guidance Document.
Radian Corp., Research Triangle Park, NC.
Nov 91, 69p EPA/450/4-91/033
Contract EPA-68-DO-0125
See also PB90-255415, PB90-256777 and PB91-195958. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

New ozone monitoring sites are required by the CAAA to enhance the existing ambient air monitoring network currently composed of State and Local Air Monitoring Stations (SLAMS), the National Air Monitoring Stations (NAMS), and Special Purpose Monitors (SPM) stations. These enhanced monitoring sites, called photochemical assessment monitoring stations (PAMS), will measure ozone, VOC (including aldehydes), and NOx concentrations, and meteorological parameters. As the PAMS will become part of the SLAMS network, they will be subject to specific siting, quality assurance, analytical methodology, sampling interval, and instrument requirements. The guidance document provides a description of the PAMS sites, and the requirements for siting and configuring the sites.

Keywords: *Ozone, *Air pollution monitoring, *Volatile organic compounds, Site surveys, Nitrogen oxides, Guidelines, Pollution regulations, Air quality, Clean Air Act, Air samplers, Data collection, Concentration(Composition), Meteorological data, Network analysis, *PAMS(Photochemical Assessment Monitoring Stations), State Implementation Plan.

PB92-145408/REB PC **A04/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Control Technology Center.
Assessment of VOC Emissions and Their Control from Baker's Yeast Manufacturing Facilities. Final rept.
Midwest Research Inst., Cary, NC.
R. Barker, and M. Williamson. Jan 92, 55p EPA/450/3-91/027
Contracts EPA-68-D1-0115, EPA-68-D0-0137
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Control Technology Center.

The Environmental Protection Agency's (EPA's) Control Technology Center (CTC) conducted a study to obtain information on the baker's yeast manufacturing industry. Baker's yeast is produced by a fermentation process that generates large quantities of ethanol and acetaldehyde. Currently, 13 facilities produce baker's yeast in the United States. The volatile organic compound (VOC) emission rate from a typical facility is estimated at 82 megagrams per year (90 tons per year). The majority of these emissions occurs in the final trade fermentations. The VOC emission alternatives that were evaluated during the study were process control measures to reduce the formation of VOC emissions as well as wet scrubbers, carbon adsorbers, incinerators, condensers, and biological filters to control VOC emissions. Of these approaches, it appears that process control measures, catalytic incinerators, or a combination of add-on control techniques (e.g., wet scrubbers followed by an incinerator or a biological filter) are the most feasible approaches for controlling yeast process emissions. Based on the results of the study, the control efficiency associated with the add-on control systems is estimated to be 95 to 98 percent. The report contains information on the baker's yeast fermentation process, the number and locations of yeast plants, the potential emissions from the process, and an evaluation of potential emission control options.

Keywords: *Air pollution control, *Emission factors, *Volatile organic compounds, *Yeasts, *Food industry, Ethanols, Fermentation, Industrial wastes, Air pollution control equipment, Incineration, Concentration(Composition), Scrubbers, Baking, Pollution sources, Acetaldehyde, Performance evaluation.

PB92-145416/REB PC **A03/MF A01**
Pesticide Fact Sheet Number 231: Prodiamine.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Feb 92, 14p EPA/540/FS-92/175

The document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on prodiamine. A Fact Sheet is issued for the following action--registration of a new chemical.

Keywords: *Pesticides, *Toxic substances, Standards, Hazardous materials, Toxicology, Nitrogen organic compounds, Herbicides, Ecology, Chemical properties, Exposure, Laboratory animals, Path of pollutants, Water pollution, Regulations, Agricultural products, Labels, *Registration, *Chemical Information Fact Sheet, *Prodiamine, Barricade, Use patterns, Science findings, CAS 29091-21-2, Phenylene diamine/N-N-dipropyl-dinitro-(trifluoromethyl).

PB92-145424/REB PC **A02/MF A01**
RED Facts: Carbon Dioxide. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Sep 91, 6p EPA/540/FS-92/178

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet 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. Carbon dioxide is the active ingredient in four pressurized liquid and gas fumigant products used to control insects in enclosed indoor areas where grain or other food and feed crops are stored.

Keywords: *Pesticides, *Toxic substances, *Carbon dioxide, Oxygen inorganic compounds, Standards, Toxicology, Regulations, Ecology, Path of pollutants, Labels, Risk assessment, Public health, Aerosols, Fumigants, Insecticides, Agricultural products, Farm crops, *Reregistration, *Chemical Information Fact Sheet, Use patterns, Science findings, Federal Insecticide Fungicide and Rodenticide Act.

PB92-145432/REB PC **A02/MF A01**
RED Facts: Silicon Dioxide and Silica Gel. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Sep 91, 6p EPA/540/FS-92/173

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 to the environment. This 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. Silicon dioxide and silica gel are insecticides and acaracides, used in controlling insects, mites and ticks in a variety of indoor and outdoor sites.

Keywords: *Pesticides, *Toxic substances, *Silicon dioxide, *Silica gel, Standards, Insecticides, Acaricides, Regulations, Toxicology, Silicon compounds, Inhalation, Ingestion(Biology), Ecology, Path of pollutants, Labels, Exposure, Public health, Risk assessment, *Chemical Information Fact Sheet, *Reregistration, Use patterns, Science findings, Federal Insecticide Fungicide and Rodenticide Act.

PB92-145440/REB PC **A02/MF A01**
RED Facts: Sodium Diacetate. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Sep 91, 6p EPA/540/FS-92/172
See also PB-274 670.

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet 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. Sodium diacetate is a fungicide and bactericide registered to control molds and bacteria, and thus prevent spoilage, in stored grains.

Keywords: *Pesticides, *Toxic substances, Standards, Preservatives, Regulations, Fungicides, Bactericides, Toxicology, Exposure, Acetates, Farm crops, Risk assessment, Public health, Ecology, Path of pollutants, Agricultural products, Labels, Food additives, Feeding stuffs, *Reregistration, *Chemical Information Fact Sheet, *Sodium diacetate, Federal Insecticide Fungicide and Rodenticide Act, Diacetic acid/(Sodium-salt), Use patterns, Science findings.

PB92-145457/REB PC **A02/MF A01**
Pesticide Fact Sheet Number 230: Clethodim.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
28 Jan 92, 10p EPA/540/FS-92/170

A review of the product chemistry, environmental fate, toxicology, ecological effects and residue chemistry data have been completed. The available data support conditional registration of Select for control of annual and perennial grasses in soybeans and cotton. Results of acute toxicity studies indicate Toxicity Category III (Caution). Chronic studies present no evidence of unacceptable health hazards resulting from the proposed uses. Ecological effects data indicate that the proposed use on cotton and soybeans will result in minimal risk to avian, aquatic and mammalian species.

Keywords: *Pesticides, *Herbicides, *Weed control, Toxicity, Grasses, Soybeans, Ecology, Hazardous materials, Utilization, Regulations, Cyclohexanones, Risk assessments, Aquatic animals, Mammals, Birds, *Toxic substances, *Clethodim, Chemical information fact sheet, CAS 99129-21-2.

PB92-145465/REB PC **A02/MF A01**
RED Facts: Dried Blood. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Sep 91, 6p EPA/540/FS-92/171

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

ucts containing a pesticide do not pose unreasonable risks when used as directed by Agency-approved labeling, and are eligible for reregistration. Dried blood, or blood meal, is produced from clean, fresh beef blood, obtained from cattle slaughter houses. Dried blood is used in combination with other pesticide active ingredients as an outdoor animal repellant. These dust formulations are applied in a band to the soil around ornamental plants, trees and shrubs, to repel rabbits and dogs.

Keywords: *Pesticides, *Toxic substances, Standards, Repellents, Regulations, Biochemistry, Toxicology, Exposure, Public health, Slaughtering house wastes, Risk assessment, Path of pollutants, Labels, Ecology, Blood, *Reregistration, *Chemical Information Fact Sheet, *Dried blood, Federal Insecticide Fungicide and Rodenticide Act, Use patterns, Science findings, Blood meal.

PB92-145473/REB PC **A02/MF A01**
RED Facts: Inorganic Nitrate/Nitrite (Sodium and Potassium Nitrates). Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Sep 91, 7p EPA/540/FS-92/174

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet 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. Sodium and potassium nitrates are pyrotechnic fumigants used as rodenticides, predacides and insecticides.

Keywords: *Pesticides, *Toxic substances, *Sodium nitrates, *Potassium nitrate, Inorganic nitrates, Nitrites, Fumigants, Rodenticides, Insecticides, Ecology, Labels, Path of pollutants, Standards, Exposure, Toxicology, Regulations, Risk assessment, *Reregistration, *Chemical Information Fact Sheet, Federal Insecticide Fungicide and Rodenticide Act, Use patterns, Science findings, Predacides.

PB92-145556/REB PC **A11/MF A03**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Crosswalk/Air Toxic Emission Factor Data Base Management System User's Manual, Version 1.2. Final rept.
Radian Corp., Research Triangle Park, NC.
S. K. Lynch. Oct 91, 248p* EPA/450/2-91/028, , EPA/SW/DK-92/030A
Contract EPA-68-DO-0125
For system on diskette see, PB92-501626. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The user's manual explains the general operation of the XATEF DBMS. It provides the necessary instructions needed to access, update, and report data base cross-reference and air toxic emission factor information. As with any computer program the user may need some practice to become familiar with all aspects of the system. After a few sessions the user will understand the data base contents and the various procedures for retrieving information. The system displays emission factor and cross-reference information in the form of output tables on the computer screen, printer, or disk file. Output table specifications consist of descriptive information for pollutants, SICs, SCCs, industrial processes, and emission sources. Authorized users may add, edit, and delete information in the data base. The data files use a standard format and might be altered by many programs currently available; however, the system is equipped to detect and prevent the use of data files modified externally. The report describes the components of the emission factor records and explains the uses and shortcomings of the information.

Keywords: *Emission factors, *Air pollution, *Toxic substances, *Data base management systems, *User manuals(Computer programs), Revisions, Documentation, Pollution sources, Chemical compounds, Standard Industry Classifications, *XATEF system, *Crosswalk/Air Toxic Emission Factor Data Base Management System, Chemical nomenclature, CAS Registry Numbers, Source Classification Codes.

PB92-146208/REB PC **A09/MF A02**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Monitoring and Research Strategy for Forests-Environmental Monitoring and Assessment Program.
Nevada Univ., Las Vegas. Environmental Research Center.
C. J. Palmer, K. H. Ritters, T. Strickland, D. L. Cassell, and G. E. Byers. Mar 92, 192p EPA/600/4-91/012
Contracts EPA-68-CO-0049, EPA-68-CO-006
See also PB90-204710 and PB91-141796. Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

To protect, manage, and use forest resources effectively, the condition of these resources must be known. Concern about documented and potential effects of air pollutants in combination with other multiple, interacting stresses has been a major impetus behind the development of monitoring programs in forests. During the past two years, the forest component of the Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP-Forests) has been working closely with the Forest Service's Forest Health Monitoring (FS-FHM) program and other government agencies to develop a multi-agency program to monitor the condition of the nation's forested ecosystems. The purpose of the document is to present a strategy that can be used as a starting point by all government agencies interested in participating in a nationwide FHM program. Monitoring issues such as design, indicator selection, and assessment are presented along with approaches to resolving these issues.

Keywords: *Forestry, *Air pollution monitoring, *Ecology, Federal agencies, Indicator species, Design, Assessments, Quality assurance, Data sampling, Strategy, Tables(Data), Graphs(Charts), *Environmental Monitoring and Assessment Program, *Forest Health Monitoring Program.

PB92-146281/REB PC **A15/MF A03**
Base Realignment and Closure 'How-to' Manual for Compliance with the National Environment Policy Act.
Department of the Army, Washington, DC.
Aug 91, 350p*

Implementation of the decisions arising from the Defense Base Closure and Realignment Act of 1990 (Title XXIX, Public Law (P.L.) 101-510) requires appropriate levels of environmental inventory, planning, consultation, permitting, and execution (see Sec. 2905(c)). Based on experience with Base Realignment and Closure I (BRAC I), the handbook provides practical guidance for Army proponents who are tasked with preparing environmental analyses pursuant to the National Environmental Policy Act of 1969 (the NEPA process). The purpose of the handbook is to ensure timely, complete, and consistent compliance with the requirements of NEPA by Army proponents during the BRAC91 realignments and closures. The 'How To' manual was conceptually derived from the 'lessons-learned' sessions held in the Pentagon following the tumultuous attempts at NEPA analysis and documentation in support of BRAC I and II. Participants in BRAC I were invited to present their views regarding successes, failures, and needed improvements to the process. While many of the ideal improvements will require more time, it was unanimously felt that a guidance document was needed which allowed all participants to have a common reference from which individual responsibilities at all levels could be performed.

Keywords: *National Environmental Policy Act, Army operations, *Environmental management, *US DOD, Endangered species, Pollution regulations, Compliance, *Military facilities, Requirements, Public opinion, Manuals, Economic impacts, Environmental impact assessments, Mitigation, Substitutes, Waste disposal, Environmental surveys, Closures, *Base Realignment and Closure Acts, *Remedial action, Defense Base Closure and Realignment Act of 1990, Cleanup.

PB92-147719/REB PC **A03/MF A01**
Concentration and Transport of Polychlorinated Biphenyls in the Housatonic River between Great Barrington, Massachusetts, and Kent, Connecticut, 1984-88. Water resources investigation.
Geological Survey, Hartford, CT. Water Resources Div.
K. P. Kulp. 1991, 18p USGS/WRI-91-4014
See also PB89-194575. Prepared in cooperation with Connecticut Dept. of Environmental Protection, Hartford.

The report describes the results of the cooperative study between the USGS and the DEP to determine the concentration and transport rate of PCBs in the Housatonic River. The primary objectives of the study were to determine the concentration of PCBs in water in the river in Connecticut, and to determine the rate that they were being transported downstream. Another objective was to evaluate changes in concentration and transport rate of PCBs that occurred since the previous study conducted in 1979-80 by Frink and others (1982). To meet the objectives, data were collected on streamflow and water samples were collected and analyzed for concentrations of suspended-sediment and PCBs. The study focuses on the Connecticut reach of the Housatonic River in the vicinity of the town of Kent in Litchfield County. The reach was selected because it is an area of prime concern to the fish and invertebrate investigation and had the greatest potential for collecting transport data during storm events. Supplemental data also were collected at several sites on the river located upstream of this reach.

Keywords: *Water pollution sampling, *Polychlorinated biphenyls, *Environmental transport, *Housatonic River, *Water quality data, Massachusetts, Connecticut, Concentration(Composition), Aquatic animals, Chlorine organic compounds, Streamflow, Sediments.

PB92-147883/REB PC **A02/MF A01**
RED Facts: Carbon. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Sep 91, 6p EPA/540/FS-92/179

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet 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. Carbon is formulated with several other pesticide active ingredients (sodium and potassium nitrates and sulfur), and used as a rodenticide, predacide and insecticide in six pyrotechnic fumigant gas cartridge products.

Keywords: *Pesticides, *Toxic substances, *Carbon, Standards, Regulations, Toxicology, Ecology, Labels, Path of pollutants, Rodenticides, Insecticides, Fumigants, Exposure, Risk assessment, Inhalation, *Reregistration, *Chemical Information Fact Sheet, Federal Insecticide Fungicide and Rodenticide Act, Use patterns, Science findings, Predacides.

PB92-147891/REB PC **A02/MF A01**
RED Facts: Propionic Acid. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Sep 91, 6p EPA/540/FS-92/177
See also PB89-114169 and PB89-114177.

EPA is directed by the Federal Insecticide, Fungicide, and Rodenticide Act as amended in 1988 (FIFRA '88) to review all pesticide products containing active ingredients initially registered before November 1, 1984, and to reregister those products that have a substantially complete data base and do not pose unreasonable adverse effects to people or the environment. This pesticide reregistration program is to be completed by the late 1990's. The RED FACTS fact sheet 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 la-

beling, and are eligible for reregistration. Propionic acid is a fungicide and bactericide, registered to control fungi and bacteria in stored grains, hay, grain storage areas, poultry litter, and drinking water for livestock and poultry.

Keywords: *Pesticides, *Toxic substances, *Propionic acid, Organic acids, Fungicides, Bactericides, Standards, Regulations, Toxicology, Ecology, Risk assessment, Path of pollutants, Grain crops, Farm storage, Poultry, Food additives, Labels, Exposure, *Reregistration, *Chemical Information Fact Sheet, Use patterns, Science findings, Federal Insecticide Fungicide and Rodenticide Act.

PB92-147909/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Recommended HVAC Standard of the Florida Radon Research Program. Final rept. Mar-Sep 90.
Florida Solar Energy Center, Cape Canaveral.
J. B. Cummings. Jan 92, 29p EPA/600/R-92/010
See also PB90-265349, PB92-105626 and PB92-105865. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab., and Florida Dept. of Community Affairs, Tallahassee.

The report contains the recommended language for the heating, ventilation, and air-conditioning (HVAC) section of the 'Florida Code for Radon-resistant Construction and Mitigation.' It deals with elements of construction that relate to the HVAC of houses. Its primary intent is to prevent pressure differentials in houses that can increase the transport of radon into houses. Three pathways of compliance are available to meet the requirements of the HVAC portion of the standards. The first is purely prescriptive. The second is a performance and prescriptive approach. The third is a marketplace approach.

Keywords: *Radon, *Building codes, *Air conditioning equipment, *Florida, *Indoor air pollution, *Residential buildings, Ventilation, Air pollution control, Construction, Specifications, Stationary sources, Differential pressure.

PB92-148519/REB PC **A04/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Radon Pressure Differential Project, Phase 1, Florida Radon Research Program. Final rept.
Florida Solar Energy Center, Cape Canaveral.
J. B. Cummings, J. J. Tooley, and N. Moyer. Jan 92, 69p EPA/600/R-92/008
Prepared in cooperation with Natural Florida Retrofit, Inc., Montverde, FL. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab., and Florida Dept. of Community Affairs, Tallahassee.

The report gives results of tests on 70 central Florida houses to assess and characterize pressure differentials in new (age 5 years or less) Florida houses. Blower door tests determined house airtightness and air distribution system leakage. The 70 houses had an average airtightness of 7.23 air changes per hour at 50 Pa (ACH50). Significant leaks were found in the ductwork in most houses tested, both on the supply and return sides of the air handler. When the air distribution system was sealed off, house ACH50 decreased to 6.42, indicating that 11.2% of the house leak area is in the duct system. Differential pressure measurements were taken between the main body of each house and subslab areas, outdoors, and many locations within the house. These measurements indicated significant pressure differentials in the house due to a number of factors. Return leaks produced a maximum whole-house pressurization of 5.5 Pa. Supply leaks produced a maximum whole-house depressurization of -4.8 Pa. Closed interior doors produced a maximum closed-room pressurization of 37 Pa and a maximum main-body depressurization of -14.8 Pa. Turning on all exhaust fans and interior dryers typically depressurized the house to 0 to -4 Pa.

Keywords: *Radon, *Florida, *Residential buildings, *Differential pressure, *Indoor air pollution, Ventilation, Air pollution control, Stationary sources, Air conditioning equipment.

PB92-149269/REB PC **E99/MF A06**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Reduction of Disinfection By-Product Precursors by Nanofiltration.
University of Central Florida, Orlando. Dept. of Civil Engineering and Environmental Sciences.
J. S. Taylor, C. R. Reiss, P. S. Jones, K. E. Morris, and T. L. Lyn. Feb 92, 758p EPA/600/R-92-023
Grant EPA-R-815288
See also PB84-191147 and PB88-153895. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The reduction of disinfection by-product (DBP) precursors by nanofiltration was investigated in Florida at both a groundwater site and a surface water site. Separate studies, involving pilot plant operations, were conducted for one year at each site. The principal research tasks at each site were membrane selection, selection of an appropriate pretreatment process and operation of the membrane pilot plant. At the groundwater site (Daytona Beach, FL), conventional pretreatment (scaling control and pre-filtration) was required to control nanofilter fouling. Over one year of pilot plant operation, the average DBP Formation Potential (DBPFP) in the system permeate was 20 micrograms/L as Cl(-), representing a 96 percent reduction in the DBPFP of the raw water. At the surface water site (Melbourne, FL), alum coagulation, GAC filtration and microfiltration were all used as pretreatment options for nanofiltration. Over one year of pilot plant operation, the average DBPFP in the system permeate of the alum coagulation/nanofiltration combination was 22 micrograms/L as Cl(-), representing a 98 percent reduction in the DBPFP of the raw water. Using the pilot plant data, capital and operation and maintenance costs were developed to construct a 10 MGD nanofiltration plant at both the groundwater and surface water sites.

Keywords: *Water treatment, *Disinfection, *Water pollution control, *Surface waters, *Ground water, Potable water, Byproducts, Cost analysis, Filtration, Chemical reactions, Alum, Granular activated carbon treatment, Operating costs, Capitalized costs, Membranes, Pilot plants, Performance evaluation, Florida, Coagulation, *Nanofiltration, Pretreatment process, Daytona Beach(Florida), Melbourne(Florida).

PB92-149277/REB PC **A07/MF A02**
Best Demonstrated Available Technology (BDAT) Background Document for Quality Assurance/Quality Control Procedures and Methodology. Final rept.
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
L. Jones. 23 Oct 91, 150p EPA/530/R-92/002
See also PB83-170514.

The document provides EPA's approach for implementing the Land Disposal Restrictions (LDR) program both in terms of how treatment standards were developed for earlier rules, and also, how EPA intends to collect and evaluate treatment data to develop treatment standards on future rules. Section 2 presents the Quality Assurance Project Plan used to evaluate treatment data collected past and present for the LDR program. Section 3 presents the methodology used for establishing treatment standards. Section 4 summarizes the treatment standards calculated and promulgated for the Solvents and Dioxins Rule, the California List Rule, and the First Third, Second Third, and Third Third Rules.

Keywords: *Hazardous materials, *Land disposal, *Waste treatment, Waste management, Standards, US EPA, Quality assurance, Instructions, Performance evaluation, Solvents, Industrial wastes, Chlorine organic compounds, Oxygen heterocyclic compounds, Herbicides, Requirements, Methodology, *Land Disposal Restrictions Program, Best demonstrated available technology.

PB92-149285/REB PC **A99/MF E16**
State Programs Advisory Number Nine. Directive (Final).
Environmental Protection Agency, Washington, DC. Office of Solid Waste and Emergency Response.
8 Jan 92, 1396p EPA/530/R-92/001, OSWER DIRECTIVE-9541.00-14
See also PB91-130211 and PB91-130229.Portions of this document are not fully legible.

The directive updates the State Authorization Manual, which replaced the State Consolidated Authorization Manual. The SPA No. 9 covers RCRA program changes for the period January 1 through June 30, 1990. Included are nine new revision checklists and ten revised existing checklists. A consolidated land disposal restrictions checklist is also included.

Keywords: *Waste management, *Hazardous materials, *Remedial action, State programs, Ground disposal, Pollution regulations, Waste disposal, Standards, Revisions, *Office of Solid Waste and Emergency Response, Resource Conservation and Recovery Act, State Authorization Manuals.

PB92-149814/REB PC **A05/MF A01**
Electric Power Research Inst., Palo Alto, CA.
Performance of Chlorine-Free Binary Zeotropic Refrigerant Mixtures in a Heat Pump.
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD.
J. Pannock, and D. A. Didion. Dec 91, 88p NISTIR-4748, EPA/600/R-92/017
See also PB87-104410. Sponsored by Electric Power Research Inst., Palo Alto, CA., and Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The phase-out of the currently used refrigerants during the next decade requires fast and accurate methods to evaluate possible alternatives for the existing refrigerants. The report investigates possible replacement refrigerants for R22, where the replacements are binary zeotropic mixtures of the following hydrofluorocarbons (HFCs): R23, R32, R125, R134a, and R152a. The method, that was chosen, is based on three steps: (1) determining possible mixture components, (2) evaluating all fifteen possible mixtures using a simulation program developed by NIST and determining the best performing mixtures, (3) evaluating the best performing mixtures in a NIST build test facility. Following the path, two refrigerant mixtures, R32/R134a and R32/R152a were found to perform better than R22 with respect to COP and volumetric capacity for certain composition ranges. The used simulation model proved to be a very precise tool in finding possible replacement fluids and their possible performance advantages. The results give the confidence that this time saving combination of simulation and testing is a very powerful engineering tool.

Keywords: *Refrigerants, *Heat pumps, Heat transfer, Chlorine, Binary mixtures, Heat exchangers, Thermodynamic properties, Computerized simulation, Cooling, Temperature, Performance evaluation, Test methods, Test facilities, *Zeotropic refrigerant mixtures.

PB92-150341/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Sulfur Oxides Control Technology Series: Flue Gas Desulfurization. Dual Alkali Process. Summary rept.
Radian Corp., Austin, TX.
Oct 80, 27p EPA/625/8-80/004
See also PB92-150358, PB92-150366 and PB84-199868.Color illustrations reproduced in black and white. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report describes a dual alkali (or double alkali) flue gas desulfurization (FGD, which is a throwaway process in which sulfur dioxide (SO2) is removed from the flue gas by a soluble sodium-based scrubbing liquor. The collected SO2 is precipitated as calcium sulfite (CaSO3), calcium sulfate (CaSO4), or a mixed crystal of both salts, and is purged from the system.

Keywords: *Sulfur dioxide, *Air pollution control equipment, Electric power plants, Industrial wastes, Combustion products, Flue gases, Scrubbing, Design criteria, Calcium oxides, Sodium carbonates, Particles, Design criteria, Cost analysis, *Coal fired power plants, *Desulfurization, Dual alkali scrubbing.

PB92-150358/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

Sulfur Oxides Control Technology Series: Flue Gas Desulfurization: Spray Dryer Process. Summary rept.
Radian Corp., Austin, TX.
1982, 31p EPA/625/8-82/009
See also PB92-150366, PB92-150341, PB81-157919, PB81-206476, PB81-218976 and PB81-243164.Color illustrations reproduced in black and white. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report describes the spray dryer flue gas desulfurization (FGD), which is a throwaway process in which sulfur dioxide (SO2) is removed from flue gas by an atomized lime slurry (Ca(OH)2). The hot flue gas dries the droplets to form a dry waste product, while the absorbent reacts with sulfur dioxide in the flue gas. Dry waste solids are collected in a fabric filter (baghouse) or electrostatic precipitator (ESP) and are typically disposed of by landfill. Descriptions of the process as well as its advantages and costs are included in the report.

Keywords: *Sulfur dioxide, *Air pollution control, *Meetings, Flue gases, Combustion products, Industrial wastes, Solid waste disposal, Absorption, Drying, Slurries, Chemical reactions, Calcium oxides, Mathematical models, Boilers, Design criteria, Performance evaluation, Nitrogen oxides, *Desulfurization, Spray dryer process.

PB92-150366/REB PC A04/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Fine Pore (Fine Bubble) Aeration Systems. Summary rept.
Radian Corp., Austin, TX.
Oct 85, 54p EPA/625/8-85/010
See also PB92-150358, PB92-150341 and PB86-184629. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

It is estimated that 50-90 percent of the power cost for wastewater treatment is for aeration. Fine pore diffusion presents the opportunity to significantly reduce these costs due to its oxygen transfer efficiency. The report provides the latest information on performance potential, requirements and costs for installation in new municipal wastewater treatment plants as well as retrofitting existing facilities, and describes the requirements for an operation and maintenance program. Although not a design manual, the document will assist practicing engineers in the selection, specification, design, and control of fine pore aeration systems.

Keywords: *Aeration, *Sewage treatment, *Municipalities, Bubbles, Layout, Aerobic processes, Pores, Activated sludge process, Diffusers, Retrofitting, Fouling, Maintenance, Requirements, Design, Operating costs, Operations.

PB92-150374/REB PC A11/MF A03
Determination of Rates of Reaction in the Gas-Phase in the Troposphere. Theory and Practice. 3. Rate of Indirect Photoreaction.
Environmental Protection Agency, Washington, DC. Office of Toxic Substances.
A. Leifer. 20 Feb 92, 238p EPA/700/R-92/002
See also PB92-150382, PB90-143165 and PB90-146291.

The report describes the development of structure/reactivity (S/R) relationships of Atkinson for the estimation of the 2nd-order rate constant k(OH) for the reaction of OH radicals with organic chemicals in the troposphere. These S/R relationships were used to estimate k(OH) at 298 K of 405 chemicals covering a variety of classes and compares them with the experimental values (% Error). Of the 405 chemicals, 20 had a % error > +100 and were omitted in the analyses. For the 385 remaining chemicals, the average % error ranged from +21 to -19. One hundred fifty-four chemicals were not used by Atkinson to derive the parameters in the S/R relationships and, therefore, were good candidates to test the validity of the S/R relationships. The average percent error of the 154 chemicals ranged from +24 to -20, thereby confirming the S/R relationships. A discussion is given on the estimation of the half-life of a chemical in the troposphere from k(OH) and the average OH concentration. The report represents the technical support document for a test guideline which can be used under section 4 of the Toxic Substances Control Act.

Keywords: *Reaction kinetics, *Atmospheric chemistry, *Photochemical reactions, *Air pollution, *Hydroxyl radicals, *Molecular structure, *Chemical reactivity, *Troposphere, Error analysis, Oxidation, Organic compounds, Mathematical models, *Structure reactivity relationships, Toxic Substances Control Act.

PB92-150382/REB PC A05/MF A01
Determination of Rates of Reaction in the Gas-Phase in the Troposphere. Theory and Practice. 4. Rate of Indirect Photoreaction.
Environmental Protection Agency, Washington, DC. Office of Toxic Substances.
A. Leifer. 20 Feb 92, 79p EPA/700/R-92/003
See also PB92-150374.

The document describes a test guideline (section 796.3900) which can be used under sections 4 and 5 of the Toxic Substances Control Act (TSCA) to regulate industrial chemicals. It describes structure/reactivity (S/R) relationships of Atkinson of the University of California/Riverside for estimating the second-order rate constant k(OH) and the associated half-life t(sub 1/2)E for the reaction of an organic chemical with hydroxyl radicals in the gas-phase in the troposphere. All pertinent parameters and equations are listed in the report to enable a scientist to calculate k(OH) and t(sub 1/2)E. Sixteen organic chemicals, covering a range of molecular structures, are used to illustrate the use of the S/R relationships of Atkinson to estimate k(OH). A hypothetical example is given to illustrate the use of these S/R relationships to define testing under section 4 of TSCA. A mathematical synopsis of the S/R relationships of Atkinson is given in Section IV of the report.

Keywords: *Reaction kinetics, *Atmospheric chemistry, *Photochemical reactions, *Air pollution, *Hydroxyl radicals, *Molecular structure, *Chemical reactivity, *Troposphere, Recommendations, Oxidation, Organic compounds, Mathematical models, *Structure reactivity relationships, Toxic Substances Control Act.

PB92-150390/REB PC A03/MF A01
Manual for the Certification of Laboratories Analyzing Drinking Water. Criteria and Procedures Quality Assurance. Third Edition. Change 1.
Environmental Protection Agency, Washington, DC. Office of Drinking Water.
Oct 91, 48p EPA/570/9-90/008A
See also PB90-220500.

Since 1978, the U.S. Environmental Protection Agency (EPA) has had a program for certifying regional laboratories, principal state laboratories in primacy states, and local laboratories in non-primacy states performing drinking water analyses required by regulations issued pursuant to the Safe Drinking Water Act. The document is change 1 to the 1990 MANUAL FOR THE CERTIFICATION OF LABORATORIES ANALYZING DRINKING WATER. Change 1 revises Chapter V. The revision includes the certification criteria for the revised Total Coliform Rule and Surface Water Treatment Requirements. The updated Chapter V is to be inserted into the 1990 manual and the previous edition of Chapter V completely removed, along with the other pages indicated on page ii of the document.

Keywords: *Drinking water, *Laboratories, *Licenses, *Water pollution abatement, Manuals, Operations, Evaluation, Coliform bacteria, Microbiology, Chemical analysis, Requirements, Safe Drinking Water Act, Certification.

PB92-150408/REB PC A05/MF A01
Environmental Profiles and Hazard Indices for Constituents of Municipal Sludge: DDT/DDE/DDD. Final rept.
Environmental Protection Agency, Washington, DC. Office of Water Regulations and Standards.
Jun 85, 92p
See also PB92-123009.

The document is one of a series of preliminary assessments dealing with chemicals of potential concern in municipal sewage sludge. The purpose of these documents is to: (1) summarize the available data for the constituents of potential concern; (2) identify the key environmental pathways for each constituent related to a reuse and disposal option (based on hazard indices); and (3) evaluate the conditions under which such a pollutant may pose a hazard. Each document provides a scientific basis for making an initial determination of whether a pollutant, at levels currently observed in sludges, poses a likely hazard to human health or the environment when sludge is disposed of by any of several methods. The methods include landspreading on food chain or nonfood chain crops, distribution and marketing programs, landfilling, incineration and ocean disposal.

Keywords: *Hazardous materials, *Sludge disposal, *Municipalities, Earth fills, Waste treatment, Incineration, Risk assessment, DDT, DDE insectide, Concentration(Composition), Public health, Toxicity, Wildlife, Soils, Aquatic plants, Profiles, Marketing, *Land application, Ocean waste disposal, Path of pollutants.

PB92-150416/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Control Technologies for Defunct lead Battery Recycling Sites: Overview and Recent Developments. Volume 3.
Foster Wheeler Enviresponse, Inc., Edison, NJ.
M. D. Royer, A. Selvakumar, and R. Gaire. 1992, 25p EPA/600/A-92/019
Contract EPA-68-C9-0033
Presented in International Seminar on Battery Waste Management (3rd), Deerfield, FL., November 4-8, 1991, v3 p1-22. See also PB92-114537. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

At least 29 lead battery recycling sites are or have been slated for investigation and possible remediation under the Superfund program. The paper condenses information regarding the characteristics and remediation of these sites. The information provided includes: (1) description of operations commonly conducted, and wastes generated; (2) technologies implemented or selected for site remediation; (3) case studies of treatability studies on common wastes; (4) past experience regarding the recyclability of materials found at the sites, and (5) profiles of potentially applicable innovative treatment technologies.

Keywords: *Waste management, *Lead acid batteries, *Waste treatment, Waste recycling, Technology utilization, Land pollution control, Case studies, Water pollution control, Hazardous materials, Leaching, Vitrification, Solidification, Stabilization, Ground disposal, *Superfund, *Remedial action, Soil washing.

PB92-150424/REB PC A03/MF A01
What Can Be Learnt from Protocols Relating to Non-Pharmaceuticals. Symposium paper.
Environmental Protection Agency, Washington, DC. Office of Health and Environmental Assessment.
C. A. Kimmel. May 91, 20p EPA/600/A-92/020, OHEA-R-437
See also PB86-108958, PB90-161530 and PB91-154617. Presented at a workshop on Current Issues in Reproductive and Developmental Toxicology, London, U.K. in May 1991.

Under the Toxic Substances Control Act (TSCA), reproductive and developmental toxicity studies are required on a case-by-case basis depending on whether or not there is reason to suspect that an agent may have reproductive or developmental effects, or if production and/or release of a chemical is likely to be substantial. Under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), standard developmental toxicity studies in two species and a two-generation reproduction study in rats are required for all food use pesticides and for non-food use pesticides when exposure is likely. Developmental neurotoxicity studies are required in cases where indications from other data suggest concern. The EPA has also developed guidelines for reproductive and developmental toxicity risk assessment that describe the evaluation of data for extrapolation to humans. These guidelines provide the basic assumptions that are made in the risk assessment process and the procedures used to estimate exposure levels that are not expected to increase the risk for reproductive or developmental effects above background incidence rates. Data from developmental toxicity, developmental neurotoxicity and reproduction studies form the primary data base used in reproductive and developmental toxicity risk assessments, but may be enhanced by data from other studies, including pharmacokinetic and mechanistic studies. The development of risk assessment guidance has been extremely helpful in identifying data needed for reducing

uncertainties, eliminating assumptions and improving the qualitative and quantitative extrapolation of data to exposed human populations.

Keywords: *Pesticides, *Toxicity, *Guidelines, Teratogens, Nervous system, Test methods, Reproduction(Biology), Fertility, Risk assessment, Humans, Health hazards, Reprints, *Toxicity testing protocols, Toxic Substances Control Act, Federal Insecticide Fungicide and Rodenticide Act.

PB92-150432/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Experimental Investigation of PIC Formation in CFC Incineration. Rept. for Jul-Sep 91.
Energy and Environmental Research Corp., Irvine, CA.
R. E. Hall, C. W. Lee, G. R. Hassel, and J. V. Ryan.
1991, 10p* EPA/600/A-92/021
Contract EPA-68-C0-0094
See also PB90-116955 and PB92-126952. Presented at ENVIRONMZXASIA/WATZRMZXASIA92 Conference, Singapore, February 18-21, 1992. Prepared in cooperation with Acurex Corp., Research Triangle Park, NC. Environmental Systems Div. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper gives results of bench-scale tests to characterize combustion emissions from chlorofluorocarbon (CFC-11 and -12) incineration. The destruction efficiencies (DEs) of the CFCs and the major products of incomplete combustion (PICs) from each CFC were determined. DEs of at least 99.999% can be attained repeatedly for both CFCs. Major PICs identified were non-halogenated: toluene and xylene were found most frequently. PIC concentrations were independent of the CFC concentration in the fuel. Sampling was performed one time to screen for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF) and polyaromatic hydrocarbons (PAHs) while incinerating CFC-12. Even with a DE of greater than 99.999%, high levels of PCDD/PCDF were formed. The extensive PCDD/PCDF formation apparently occurred in the absence of entrained particulate matter.

Keywords: *Combustion efficiency, *Incinerators, *Freons, *Air pollution sampling, Waste disposal, Fluorohydrocarbons, Chlorohydrocarbons, Combustion products, Aromatic polycyclic hydrocarbons, Concentration(Composition), Destruction, Experimental design, Polychlorinated dibenzodioxins, Polychlorinated dibenzofurans, Dichlorodifluoromethane, Freon 11, Freon 12.

PB92-150440/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Solvent Use Emissions Estimation Methodologies: Future Implications. Rept. for Feb-May 91.
Alliance Technologies Corp., Chapel Hill, NC.
M. Saeger, R. Strait, and J. Chappell. 1992, 15p EPA/600/A-92/022
Contract EPA-68-D9-0173
Presented at Air and Waste Management Association Conference, Durham, NC., September 9-10, 1991. See also PB92-118017. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper reviews uses of emissions data from solvent use activities and evaluates how the Clean Air Act Amendments of 1990 (CAAA) will affect future solvent use emissions estimation methodologies. Results of the work will be used to identify research opportunities and in planning activities that will be pursued by the Joint Emissions Inventory Oversight Group (JEIOG) over the next 2 or 3 years. CAAA requirements place increasing emphasis on baseline and future-year emissions inventories. The JEIOG, cochaired by EPA's Air and Energy Engineering Research Laboratory (AEERL), Office of Air Quality Planning and Standards (OAQPS), and Atmospheric Research and Exposure Assessment Laboratory (AREAL), is coordinating research programs to: (1) evaluate existing methodologies for estimating emissions of criteria pollutants to support state implementation plan and national emissions inventory data, and (2) recommend improvements to those methodologies if warranted. One aspect of the research is focused on the development of emissions inventories for solvent use activities.

Keywords: *Volatile organic compounds, *Air pollution, *Emission, *Estimating, *Organic solvents, Air pollution control, Stationary sources, Clean Air Act.

PB92-150457/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Climate. Book chapter.
Nevada Univ. System, Las Vegas. Desert Research Inst.
M. R. Rose, M. Boehm, and R. K. Olson. 1992, 27p EPA/600/A-92/023
Pub. in The Response of Western Forest to Air Pollution, Chapter 2, Springer-Verlag. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR. Sponsored by Corvallis Environmental Research Lab., OR.

Climate determines the types of forests which can occupy a particular region, and climate as modified by topography largely controls the spatial patterns of forest types within a region. Since analyses of trends in annual growth increments are central to the regional air pollution effects studies described in other chapters, an understanding of the general patterns and variability of climate in the West is necessary for interpreting the results of those studies. In the chapter, the general patterns and causes of climate over the western United States are described. More detailed climatic descriptions are then presented for the five regions of the western United States discussed later in the volume: Northwestern Washington; the Colorado Front Range; Arizona and New Mexico; Sierra Nevada; and southern California. Mean seasonal temperature and precipitation are characterized for selected climatic divisions within the regions. The Palmer Drought Severity Index is used to discuss temporal variability in the climate of these regions.

Keywords: *Climate, Spatial distribution, Temporal distribution, Seasonal variations, Temperature, Precipitation(Meteorology), Forests, Plant growth, Air pollution effects(Plants), Regional analysis, Reprints, *Western Region(United States).

PB92-150465/REB PC **A03/MF A01**
Microbial Transport through Porpus Media: The Effects of Hydraulic Conductivity and Injection Velocity. Symposium paper.
National Center for Ground Water Research, Houston, TX.
H. J. Marlow, K. L. Duston, M. R. Wiesner, M. B. Tomson, and J. T. Wilson. c1992, 11p EPA/600/A-92/024
Contract EPA-DW14934013
Pub. in Bioremediation: Fundamentals and Effective Applications, Proceedings Annual Symposium Gulf Coast Hazardous Substance Research Center (3rd), p75-82, Feb 21-22, 91. See also PB87-168084. Prepared in cooperation with Robert S. Kerr Environmental Research Lab., Ada, OK.

The work was motivated in part by interest in the injection of microorganisms with novel metabolic capabilities to remediate hazardous waste sites as well as by the importance of assessing the transport of pathogenic microorganisms to infiltration galleries and wells used for drinking water supplies. The effects of hydraulic conductivity and injection velocity on microbial transport through porous media were investigated. Glass chromatography columns were packed separately with clean quartz sand of two diameters (0.368 mm or 0.240 mm) and two hydraulic conductivities (.137 cm/sec and .0365 x 10-2 cm/sec respectively). Three injection velocities, .00118, .00235 and .00473 cm/sec were investigated. Microbial transport under the conditions tested was limited and could be predicted mathematically using a model for physicochemical filtration.

Keywords: *Biological treatment, *Microorganisms, *Environmental transport, *Porous media, *Path of pollutants, Remedial action, Waste management, Hydraulic conductivity, Injection, Water pollution control, Filtration, Physicochemical properties, Experimental design, Potable water, Soil dynamics, Aquifers, Land pollution control, Hazardous materials, Reprints.

PB92-150473/REB PC **A02/MF A01**
Field Testing Pesticide Transport Models at a Cooperative Test Site Near Plains, Georgia.
Environmental Research Lab., Athens, GA.
C. N. Smith, D. S. Brown, R. S. Parrish, L. E. Asmussen, and R. A. Leonard. c1991, 6p EPA/600/A-92/025
Proceedings of the Georgia Resources Conference, 1991. The University of Georgia, Athens, GA. p298-301. See also PB85-242519, PB90-120056 and PB90-193053. Prepared in cooperation with Computer Sciences Corp., Athens, GA., Agricultural Research Service, Tifton, GA. Southeast Watershed Research Lab., Geological Survey, Doraville, GA. Water Resources Div., and Georgia Univ., Athens.

The U.S. Environmental Protection Agency, the U.S. Department of Agriculture, the U.S. Geological Survey, and The University of Georgia Agricultural Experiment Station developed a joint research effort to investigate and to model pesticide movement at a field site. The participants are sharing technical expertise and resources to develop a better understanding of physical, chemical, and biological processes that affect leaching, to evaluate spatial and temporal variability, and to develop and test linked models for chemical transport and transformation. The paper describes the field design and presents preliminary pesticide leaching results obtained in the first year of the 5-year study.

Keywords: *Environmental transport, *Pesticides, *Farm management, Mathematical models, Field tests, Leaching, Aquifers, Farm crops, Sites, Design, Runoff, Sediment transport, Atrazine, Herbicides, Chlorine organic compounds, Nitrogen heterocyclic compounds, Triazines, Measurement, Drift, *Plains(Georgia), Carbofuran, Lasso.

PB92-150481/REB PC **A03/MF A01**
Abiotic Transformations of Pesticides in Natural Waters and Sediments.
Environmental Research Lab., Athens, GA.
N. L. Wolfe. c1991, 14p EPA/600/A-92/026, ISBN-0-471-50232-4
Pub. in Fate of Pesticides and Chemicals in the Environment p93-104 1992. See also PB88-218391.

Selected organic compounds can undergo abiotic reduction in anaerobic sediment systems. The factors that govern these reactions are not well defined, but the chemistry and the biology are strongly coupled. No ideal methodology is now available to quantitatively separate the contribution of the biological processes from the chemical processes. In fact, to rigorously model redox processes, it may be necessary to model additional processes that take into account bio-organic and bio-inorganic reactants produced as a result of microbial activity. Sediment-associated reducing agents responsible for reduction in the studies are not known. The identity, as well as the activity, of the reducing agents is required to develop quantitative expressions that describe abiotic reduction. A working model has been suggested to account for the observations reported for the abiotic reactions.

Keywords: *Pesticides, *Water pollution, *Sediments, Organic compounds, Oxidation reduction reactions, Kinetics, Ecology, Mathematical models, Reprints, Biotransformation.

PB92-150499/REB PC **A03/MF A01**
Sunlight-Induced Oxidation and Reduction of Organic Xenobiotics in Water, 1992.
Environmental Research Lab., Athens, GA.
R. G. Zepp. c1992, 29p EPA/600/A-92/027, ISBN-0-471-50232-4
Pub. in Fate of Pesticides and Chemicals in the Environment, p127-140 1992. See also report dated Feb 88, PB88-170493.

A wide variety of optical properties can be found in the water bodies of the environment. These dramatic differences in composition, and thus in light absorption, have important effects on the dynamics and products of xenobiotic photoreactions in water. The paper reviews research showing that the absorption of sunlight by natural waters produces a variety of transient reactants that are involved in aquatic redox reactions. The review first examines two general approaches to studying photoredox kinetics--laser flash photolysis and continuous irradiations. Then, research results concerning some of the transient reactants are used to illustrate the application of these approaches. Among these transients are solvated electrons, triplet states and singlet oxygen, and superoxide ions and hydrogen peroxide.

Keywords: *Water pollution, *Oxidation reduction reactions, *Sunlight, *Xenobiotics, *Photochemistry, Superoxide, Hydrogen peroxide, Free radicals, Kinetics, Optical properties, Reprints.

PB92-150507/REB PC A03/MF A01
Vertebrate Toxicology of the Solubilized Parasporal Crystalline Proteins of 'Bacillus thuringiensis' Subsp. 'israelensis'.
Health Effects Research Lab., Research Triangle Park, NC.
R. M. Roe, V. L. Kallapur, W. C. Dauterman, F. W. Edens, and M. E. Mayes. c1992, 20p EPA/600/A-92/028
Prepared in cooperation with North Carolina State Univ. at Raleigh, Maine Univ. at Orono. Dept. of Entomology, and Northeastern Oklahoma State Univ., Tahlequah.

The review summarizes the studies done with the mammalian toxic Bacillus thuringiensis subsp. israelensis (Bti) 28 kDa cytA protein. The data is relevant to hazard identification studies with bacterial pesticides. The data shows the cytA produces lethal physiological changes in diverse mammalian species when administered intraperitoneally and a dose-dependent localized necrosis by the subcutaneous route. Challenge by other routes have no effects. The cytA protein is a minor component of the insecticidal activity of the Bti parasporal crystal. Insertion of the cytA gene by genetic engineering methods into microbial species that have the potential to invade traumatized tissues or organs could result in detrimental human health effects.

Keywords: *Bacillus thuringiensis, *Biological pest control, *Bacterial proteins, *Toxicity, *Vertebrates, Mammals, Environmental exposure pathways, Nervous system, Muscles, Hemolysis, Culicidae, Heart rate, Mice, Coturnix, Body temperature, Bti parasporal crystal.

PB92-150515/REB PC A03/MF A01
Assessment of Toxicant-Induced Alterations in the Luteinizing Hormone Control of Ovulation in the Rat.
Health Effects Research Lab., Research Triangle Park, NC. Reproductive Toxicology Branch.
J. M. Goldman, and R. L. Cooper. 1992, 24p EPA/600/A-92/029

In the female rat, the large surge of luteinizing hormone (LH) from the pituitary into the general circulation that takes place on the afternoon of the day of vaginal proestrus is both a measurable and functional hormonal event. Since its occurrence is necessary for the expression of the terminal processes associated with the meiotic maturation of the oocyte and maturation of the ovarian follicle, it can serve as a valuable measure of reproductive integrity in the cycling female rat following toxicant exposure. Consequently, the present chapter describes three alternative approaches commonly used to evaluate the LH surge, along with detailed techniques of blood sampling by tail vein nicks and jugular catheterization that can be incorporated into studies of female reproductive toxicity.

Keywords: *Toxic substances, *Ovulation, *LH, Estrus, Estradiol, Radioimmunoassay, Test methods, Graafian follicle, Ovum, Rats.

PB92-150523/REB PC A03/MF A01
Environmental Monitoring Systems Lab., Las Vegas, NV.
Formation of Hemoglobin Adducts of Acrylamide and Its Epoxide Metabolite Glycidamide in the Rat. Journal article.
Washington Univ., Seattle. Dept. of Environmental Health.
E. Bergmark, C. J. Calleman, and L. G. Costa. c1991, 14p EPA/600/J-92/037
Pub. in Toxicology and Applied Pharmacology, v111 p352-363 1991. See also PB90-151762. Presented at the Annual Meeting of the Society of Toxicology (30th), Dallas, TX., February 25-March 1, 1991. Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

A method was developed for the determination of hemoglobin (Hb) adducts form by the neurotoxic agent acrylamide and its mutagenic epoxide metabolite glycidamide. The method was based on simultaneous measurements of the cysteine adducts formed by these two agents by means of gas chromatography/mass spectrometry in hydrolyzed hemoglobin samples. Rats were injected ip with acrylamide or glycidamide in doses ranging from 0 to 100 mg/kg body wt, and the hemoglobin adduct levels were determined. The hemoglobin binding index of acrylamide to cysteine was found to be 6400 pmol/g Hb/micromol/kg body wt, higher than for any other substance studied so far in the rat, and 1820 pmol/gHb/micromol/kg body wt for glycidamide. In rats injected with acrylamide, formation of adducts of the parent compound was approximately linear with dose (0-100 mg/kg), whereas adducts of the epoxide metabolite glycidamide generated a concave curve, presumably reflecting the Michaelis-Menten kinetics of its formation. On the basis of the rate constants for cysteine adduct formation determined in vitro, the first-order rates of elimination of acrylamide and glycidamide from the blood compartment of rats were estimated to be 0.37 and 0.48/hr, respectively, using a linear kinetic model. Subchronic treatment of rats with acrylamide (10 mg/kg/day for 10 days or 3.3 mg/kg/day for 30 days) confirmed that the conversion rate of acrylamide to glycidamide, as determined from hemoglobin adduct formation, is higher at low-administered doses. These findings suggest that dose-rate effects may significantly affect risk estimates of this compound and that different low-dose extrapolation procedures should be employed for effects induced by the parent compound acrylamide and those induced by the metabolite glycidamide.

Keywords: *Hemoglobin, *Acrylamides, *MSH release inhibiting hormone, *Toxicity, Mutagens, Mass fragmentography, Kinetics, Rats, Epoxides, Dose-response relationships, Alkylation, In vitro analysis, Pharmacokinetics, Nervous system, Reprints.

PB92-150531/REB PC A02/MF A01
Environmental Monitoring Systems Lab., Cincinnati, OH.
Differentiation of 'Giardia duodenalis' from Other 'Giardia spp.' by Using Polymerase Chain Reaction and Gene Probes. Journal article.
Louisville Univ., KY. Dept. of Biology.
M. H. Mahbubani, A. K. Bej, M. H. Perlin, F. W. Schaefer, and W. Jakubowski. c1992, 7p EPA/600/J-92/038
Contract EPA-R-815955
Sponsored by Environmental Monitoring Systems Lab., Cincinnati, OH.

Giardia is a waterborne organism that is the most commonly identified pathogenic intestinal protozoan in the United States. Current detection techniques for Giardia in water include microscopy and immunofluorescence techniques. Speciation of the genus Giardia has been based on taxonomic criteria such as cell morphology and host specificity. Classification based on these criteria is inadequate for determining the different species of Giardia. The authors have developed a PCR-gene probe based detection system specific for Giardia, which can discriminate between the human relevant species of the G. duodenalis group and other Giardia species. The method can detect a single Giardia cyst and is therefore, sensitive enough for environmental monitoring.

Keywords: *Giardia, *Polymerase chain reaction, *DNA probes, *Aquatic microbiology, Environmental monitoring, Polyacrylamide gel electrophoresis, Microbial sensitivity tests, Deoxyribonucleic acids, Taxonomy, Reprints, *Giardia duodenalis, Giardia muris, Giardia ardeae.

PB92-150549/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Forest Soil Response to Acid and Salt Additions of Sulfate: 2. Aluminum and Base Cations. Journal article.
Illinois Univ. at Urbana-Champaign. Dept. of Forestry.
M. B. David, G. F. Vance, and W. J. Fasth. c1991, 13p EPA/600/J-92/039
Pub. in Soil Science, v151 n3 p208-219 Mar 91. See also PB92-106182. Prepared in cooperation with Wyoming Univ., Laramie. Dept. of Plant, Soil, and Insect Sciences. Sponsored by Corvallis Environmental Research Lab., OR.

Reconstructed spodosol and intact alfisol soil columns were used to examine the effects of 52 weeks of additions of various simulated throughfall solutions on base cation, Al, acid neutralizing capacity, and pH levels in soil leachates. The work illustrates the importance of soil cation exchange (especially in the forest floor), anion concentrations, and pCO2 levels in controlling the leachate chemistry in response to acidic and 'seasalt' deposition events.

Keywords: *Forest land, *Soil analysis, *Acidification, *Land pollution, Sodium sulfates, Sodium chloride, Soil chemistry, Aluminum, Adsorption, Neutralizing, Concentration(Composition), Sulfuric acid, Cation exchanging, pH, Weathering, Reprints, *Spodosol, *Alfisol, Leachates.

PB92-150556/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Soil Response to S and N Treatments in a Northern New England Low Elevation Coniferous Forest. Journal article.
Maine Univ. at Orono. Dept. of Plant, Soil and Environmental Sciences.
I. J. Fernandez, and L. E. Rustad. c1990, 18p EPA/600/J-92/040
Pub. in Water, Air and Soil Pollution, v52 p23-39 1990. Sponsored by Corvallis Environmental Research Lab., OR.

A field experiment was designed to evaluate the effects of differing forms of acidifying S and N compounds on the chemistry of soils and soil solutions in a low elevation coniferous forest in northern New England. Treatments consisted of 0, 1500, 3000, and 6000 eq of SO4(-2) or NO3(-)/ha for the 1987 growing season applied biweekly as H2SO4 or HNO3, or in a single application as dry (NH4)2SO4. Acidifying treatments resulted in a significant increase in soil solution SO4(-2) (1.2 to 2.6) or NO3(-) (12 to 80) in the upper B horizon. Excess strong acid anion leaching was associated with an accelerated loss of base cations, particularly Mg(2-). As solutions passed through the upper 25 cm of the soil profile, mean SO4(-2) concentrations decreased by 5 to 50% of the initial values, indicating that much of the applied SO4(-2) was immobilized in the upper portion of the pedon. Elevated concentrations of adsorbed and water-soluble SO4(-2) indicate that abiotic adsorption of SO4(-2) by soils is the dominant mechanism for the initial attenuation of SO4(-2) concentrations in these solutions. Other soil properties showed only small or no change due to treatments over the single growing season of the study. The results indicate that H2SO4, HNO3, and (NH4)2SO4 can all effectively increase strong acid anion concentrations in the soil-soil solution system. (Copyright (c) 1990 Kluwer Academic Publishers.)

Keywords: *Forest soils, *Soil chemistry, *Land pollution, *Acidification, Deposition, Cation exchanging, Environmental transport, Nitrification, Nitrogen, Chemical properties, Wet methods, Dry methods, Sulfuric acid, Nitric acid, Sulfur, Reprints, *Northern Region(New England).

PB92-150564/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Forest Soil Response to Acid and Salt Additions of Sulfate: 3. Solubilization and Composition of Dissolved Organic Carbon. Journal article.
Wyoming Univ., Laramie. Dept. of Plant, Soil, and Insect Sciences.
G. F. Vance, and M. B. David. c1991, 11p EPA/600/J-92/041
Pub. in Soil Science, v151 n4 p297-305 1991. Prepared in cooperation with Illinois Univ. at Urbana-Champaign. Dept. of Forestry. Sponsored by Corvallis Environmental Research Lab., OR.

A year-long experiment, using reconstructed spodosol and intact alfisol soil columns, was conducted to examine the effects of various simulated throughfall solutions on soil C dynamics. Soil organic C solubilization, dissolved organic C fractions, and decomposition rates were studied using simulated acidic and salt throughfall solutions. Based on the results of the study the authors propose that throughfall solutions of pH above 3.7 will have little or no influences on dissolved organic C cycling in the types of spodosol and alfisol forest soils used here. However, at pH 3.0 some alterations in organic C solubilization, dissolved organic C fractions, and mobility could be expected.

Keywords: *Forest soils, *Throughfall, *Soil dynamics, *Land pollution, *Sulfates, Solubility, Deposition, pH, Leaching, Environmental transport, Acidification, Dissolved organic matter, Sulfuric acid, Nitric acid, Inorganic salts, Inorganic acids, Decomposition reactions, Reprints, *Dissolved organic carbon.

PB92-150572/REB PC **A03/MF A01**
Corvallis Environmental Research Lab., OR.
Inferences about Solute Transport in Macroporous Forest Soils from Time Series Models. Journal article.
Virginia Univ., Charlottesville. Dept. of Environmental Sciences.
G. M. Hornberger, K. J. Beven, and P. F. Germann.
c1990, 15p EPA/600/J-92/042
Pub. in Geoderma, v46 p249-262 1990. Prepared in cooperation with Bern Univ. (Switzerland). Geographisches Inst., and Lancaster Univ. (England). Inst. of Environmental and Biological Sciences. Sponsored by Corvallis Environmental Research Lab., OR.

Solutes can move along macropores and other preferred flow channels in forest soils when input rates at the surface are high enough. In natural systems, the actual flow paths are, to all intents and purposes, indeterminate. The use of transfer function models to represent solute transport has been proposed under these circumstances. The authors estimated parameters in a discrete-time version of a transfer function model for a sequence of experiments performed by sprinkling an isolated soil block in a forested catchment near Orono, Maine. All experiments were performed at steady flow by adding a quantity of water labeled with potassium bromide. The travel time of solute in the soil block was computed for each of three application rates and the effective mixing volume of the solute within the block was inferred from the time series parameters. Results show that significant macropore flow occurs in the soil block. Despite the importance of macropore flow, the fractional volume of the total pore water that participates in solute transport decreases only slightly with increasing flow rate. (Copyright (c) 1990 Elsevier Science Publishers B.V.)

Keywords: *Solutes, *Environmental transport, *Mathematical models, *Soils, Time series analysis, Forests, Porous media, Water pollution, Reprints, *Macropores, Path of pollutants.

PB92-150580/REB PC **A02/MF A01**
Corvallis Environmental Research Lab., OR.
Spodosol Cation Release and Buffering of Acidic Inputs. Journal article.
Wyoming Univ., Laramie. Dept. of Plant, Soil, and Insect Sciences.
G. F. Vance, and M. B. David. c1991, 9p EPA/600/J-92/043
Pub. in Soil Science, v151 n5 p362-368 May 91. See also PB91-116798. Prepared in cooperation with Illinois Univ., Urbana. Dept. of Forestry. Sponsored by Corvallis Environmental Research Lab., OR.

The release and leaching of base cations and aluminum by acid additions to O and B soil horizons was examined using both batch and column experimental methods. Solution and soil contact time was a significant factor in the amount of cation release and leaching from the B horizon. Increased acidity resulted in greater levels of base cations and aluminum being released or leached from all soils. The type of acid anion, NO3(-) or SO4(-2), strongly influenced the amount of soil base cation released; Ca(2+) was much lower in the H2SO4 extracted solutions. Gypsum formation was suggested as a possible explanation for the decreased Ca(2+) levels; however, SO4(-2) adsorption was also believed to contribute to the reduction in base cation release. Proton buffering was due to three soil processes which included: cation exchange reactions, protonation of organic constituents, and SO4(-2) adsorption. Differences in contact time and solution composition were deemed to be important factors in cation release from the soils. (Copyright (c) 1991 by Williams & Wilkins.)

Keywords: *Soil chemistry, *Land pollution, *Cations, *Acidification, *Buffers, Deposition, Forest soils, Adsorption, Leaching, pH, Acid neutralizing capacity, Cation exchanging, Proton transport, Reprints, *Spodosol.

PB92-150598/REB PC **A02/MF A01**
Near-Continuous Measurement of Hydrogen Sulfide and Carbonyl Sulfide by an Automatic Gas Chromatograph. Journal article Mar 89-Mar 90.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
E. R. Lindgren, D. W. Pershing, D. A. Kirchgessner, and D. C. Drehmel. c1991, 8p EPA/600/J-92/044
Pub. in Jnl. of Chromatography, v585 p353-358 1991. Prepared in cooperation with Utah Univ., Salt Lake City. Dept. of Chemical Engineering.

The article describes an automatic gas chromatograph with a flame photometric detector (GC-FPD) that samples and analyzes hydrogen sulfide (H2S) and carbonyl sulfide (COS) at 30-sec intervals. Temperature programming was used to elute trace amounts of carbon disulfide (CS2) present in each injection from a Supelpak-S column in a single peak at the end of 15 min runs. The system was used to study the high-temperature fuel-rich sulfur capture reactions of H2S and COS with injected calcium oxide (CaO) sorbent, necessitating the near continuous measurement of these gaseous sulfur species. The H2S concentration ranged from 300 to 3000 ppm, and the COS from 30 to 300 ppm. The system was also used to monitor sulfur dioxide (SO2) levels under fuel-lean conditions: results compared very closely with SO2 measurements made simultaneously with continuous ultraviolet (UV) SO2 instrumentation.

Keywords: *Hydrogen sulfide, *Gas chromatography, *Sulfides, Carbon disulfide, Sulfur dioxide, Air pollution control, Calcium oxides, Reprints, *Carbonyl sulfide, Sulfur capture reactions.

PB92-150606/REB PC **A02/MF A01**
Predicting the Toxicity of Bulk Sediments to Aquatic Organisms with Aqueous Test Fractions: Pore Water versus Elutriate. Journal article.
Environmental Research Lab., Duluth, MN.
G. T. Ankley, M. K. Schubauer-Berigan, and J. R. Dierkes. c1991, 10p EPA/600/J-92/045, TR-03-91
Pub. in Environmental Toxicology and Chemistry, v10 p1359-1366 Aug 91. See also PB90-198110 and PB90-217696. Prepared in cooperation with AScI Corp., Duluth, MN.

The objective of the research was to evaluate the acute toxicity of bulk sediment vs. pore water or elutriate to fathead minnows (Pimephales promelas), cladocerans (Ceriodaphnia dubia), amphipods (Hyalella azteca), and oligochaetes (Lumbriculus variegatus). A total of 29 different samples from seven sites were used for this analysis. In most instances, pore water was more toxic than corresponding elutriate. Based on the results of the assays, pore water, but not elutriate, was an effective test fraction for predicting the presence of bulk sediment toxicity; however, there were a number of observations of pore water toxicity in the absence of bulk sediment toxicity. Data from the study concerning the sensitivity of Pimephales promelas, Hyalella azteca, and Lumbriculus variegatus to bulk sediment vs. pore water or elutriate suggest that upper-water-column species are inappropriate organisms for use in bulk sediment tests focused on evaluating in situ toxicity to benthic species. Hyalella azteca was the most sensitive and Lumbriculus variegatus the least sensitive species evaluated.

Keywords: *Water pollution effects(Animals), *Toxicity, *Sediments, *Pore water, Benthos, Bioassay, Sediment water interfaces, Elution, Exposure, Adsorption, Aquatic animals, Reprints, *Elutriates.

PB92-150614/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Fuel Cell Energy Recovery from Landfill Gas. Journal article.
International Fuel Cells Corp., South Windsor, CT.
G. J. Sandelli, and R. J. Spiegel. c1992, 12p EPA/600/J-92/046
Contract EPA-68-01-0008
Pub. in Jnl. of Power Sources, v37 p255-264 1992. See also PB91-197061 and PB92-121235. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

International Fuel Cells Corporation is conducting a US Environmental Protection Agency (EPA) sponsored program to demonstrate energy recovery from landfill gas using a commercial phosphoric acid fuel cell power plant. The US EPA is interested in fuel cells for the application because it is the cleanest energy conversion technology available. The paper discusses the results of Phase I, a conceptual design, cost, and evaluation study. The conceptual design of the fuel cell energy recovery concept is described and its economic and environmental feasibility is projected. Phase II will include construction and testing of a landfill gas pretreatment system which will render landfill gas suitable for use in the fuel cell. Phase III will be a demonstration of the energy recovery concept. (Copyright (c) 1992 - Elsevier Sequoia.)

Keywords: *Air pollution control, *Waste management, *Methane, *Energy recovery, *Fuel cell power plants, *Earth fills, Chemical feedstocks, Ground release, Gas production, Feasibility studies, Energy source development, Economic analysis, Design criteria, Performance evaluation, Reprints, Pretreatment process.

PB92-150622/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Current Status of ADVACATE Process for Flue Gas Desulfurization (Journal Article). Rept. for Sep 90-Mar 91.
Acurex Corp., Research Triangle Park, NC.
B. W. Hall, C. Singer, W. Jozewicz, C. B. Sedman, and M. A. Maxwell. c1992, 10p EPA/600/J-92/047
Contract EPA-68-DO-0141
Pub. in Jnl. of Air and Waste Management Association, v42 n1 p103-110 Jan 92. See also PB89-208920, PB89-214134 and PB91-226423. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses current bench- and pilot-plant advances in preparation of ADVAnced siliCATE (ADVACATE) calcium silicate sorbents for flue gas desulfurization. It also discusses current bench- and pilot-plant advances in sorbent preparation. Fly ash was ground in a laboratory-scale grinder prior to slurrying in order to decrease the slurrying time needed for the sorbent to be reactive with SO2. Reactivity of ADVACATE sorbents with SO2 in the bench-scale reactor correlated with their surface area. ADVACATE sorbents produced with ground fly ash were evaluated in the 1.42 cu m/min pilot plant, providing 2 s duct residence time. ADVACATE sorbent was produced by slurrying ground fly ash (4.3 micrometer median particle size) with Ca(OH)2 at a weight ratio of 3:1 at 90 C for 3 h to yield solids with 30 wt % of initial free moisture. When the sorbent was injected into the duct with 1500 ppm SO2 and at 11 C approach to saturation, the measured SO2 removal was about 60% at a Ca/S stoichiometric ratio of 2.0. Previously, when ADVACATE sorbent was produced at 90 C and at the same fly-ash-to-Ca(OH)2 weight ratio using unground fly ash, removal under the same conditions in the duct was about 50% following 12 h slurrying. The report gives results of pilot-scale recycle tests at the recycle ratio of 2.0. Finally, the report discusses EPA's plans to commercialize ADVACATE.

Keywords: *Air pollution control, *Fly ash, Calcium silicates, Performance evaluation, Sorbents, Sulfur dioxide, Pilot plants, Bench-scale experiments, Calcium hydroxides, Injection, Reprints, *Flue gas desulfurization, *ADVACATE process, *Waste utilization.

PB92-150630/REB PC **A01/MF A01**
EPA's Research Projects Relating to the Dual-Circuit and Lorenz Refrigerator/Freezers. Journal article May 89-Dec 90.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
J. C. Bare. c1992, 4p EPA/600/J-92/048
Pub. in Jnl. of the Air and Waste Management Association, v42 n1 p68-69 Jan 92. See also PB90-262833.

The paper discusses EPA research projects relating to the dual-circuit and Lorenz refrigerator/freezers (RFs). EPA is interested in not only phasing out chlorofluorocarbons (CFCs) in RFs, but doing so in a way that will maximize energy efficiency and minimize subsequent impacts on the greenhouse effect. An early decision was made to concentrate on replacing fully halogenated CFCs in RFs during the first year of EPA's research. RFs were chosen because they are small, require small quantities of refrigerants, are relatively easy to modify and test, and are the most energy-consumptive appliances in most U.S. households. In the future, other applications are expected to receive more attention. The first year of EPA's program has concentrated on implementing two alternative configurations of RFs which are believed to have the potential to make RFs more energy efficient: the dual-circuit and the Lorenz RFs. Research has included modeling alternative refrigerants and Non-azeotropic Refrigerant Mixtures (NARMs) in the dual-circuit and Lorenz configurations

and experimental testing of modified RFs and refrigeration components in test stands.

Keywords: *Air pollution abatement, *Refrigerators, *Freezers, *Refrigerants, Environmental chemical substitutes, Energy conservation, Fluorohydrocarbons, Greenhouse effect, Chlorohydrocarbons, Design criteria, Heat exchangers, Computerized simulation, Reprints, Non-azeotropic refrigerant mixtures.

PB92-150648/REB PC A03/MF A01
Contribution of Ammonia, Metals and Nonpolar Organic Compounds to the Toxicity of Sediment Interstitial Water from an Illinois River Tributary. Journal article.
Environmental Research Lab.-Duluth, MN.
M. K. Schubauer-Berigan, and G. T. Ankley. c1991, 17p EPA/600/J-92/050
Pub. in Environmental Toxicology and Chemistry, v10 p925-939, Dec 91. See also PB89-205611. Prepared in cooperation with ASci Corp., Duluth, MN.

Toxicity of Illinois River bulk sediment, sediment interstitial (pore) water and elutriates to the oligochaete Lumbriculus variegatus, fathead minnow (Pimephales promelas) and the amphipod Hyalella azteca was compared to determine the most representative aqueous fraction for toxicity identification evaluation (TIE) studies. Toxicity of pore water corresponded better than elutriates to bulk sediment toxicity. Subsequent TIE procedures conducted with the cladoceran Ceriodaphnia dubia indicated that ammonia, metals and nonpolar organic compounds (nonylphenols, polycyclic aromatic hydrocarbons, benzenes, long-chain hydrocarbons) were responsible for toxicity of the sediment pore water. Results of TIE manipulations also suggested that methods for recovering pore water that include filtration may eliminate, a priori, a major component of the sediment contaminants responsible for toxicity.

Keywords: *Sediments, *Toxicity, *Pore water, *Water pollution effects(Animals), Sediment-water interfaces, Rivers, Illinois, Ammonia, Metals, Organic compounds, Porous materials, Elution, Reprints, *Elutriates.

PB92-150655/REB PC A03/MF A01
EPA SITE Demonstration of the BioTrol Soil Washing Process. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
M. K. Stinson, H. S. Skovronek, and W. D. Ellis. c1992, 29p EPA/600/J-92/051
Pub. in Jrnl. of Air and Waste Management Association, v42 n1 p96-103 1991. See also PB91-182279 and PB91-228056. Prepared in cooperation with Science Applications International Corp., Paramus, NJ.

A pilot-scale soil washing process, patented by BioTrol, was demonstrated on soil that was contaminated by wood treating waste. The BioTrol Soil Washing was demonstrated in a treatment train sequence with two other pilot-scale units of BioTrol technologies for treatment of waste streams from the soil washer. The three technologies of the treatment train were: The BioTrol Soil Washer (BSW), the BioTrol Aqueous Treatment System (BATS), and the Slurry Bioreactor (SBR). The BioTrol processes were evaluated on pentachlorophenol (PCP) and polynuclear aromatic hydrocarbons (PAHs), which were the primary soil contaminants at the site. The sandy site soil, consisting of less than 10% of fines, was well suited for treatment by soil washing. The BSW successfully separated the feed soil (100% by weight) into 83% of washed soil, 10% of woody residues, and 7% of fines. The soil washer achieved up to 89% removal of PCP and PAHs, based on the difference between their levels in the feed soil and in the washed soil. The BATS degraded up to 94% of PCP in the process water from soil washing. The SBR achieved over 90% removals of PCP and 70-90% removals of PAHs, respectively from the soil washing. Cost of a commercial-scale soil washing, assuming use of all three technologies, was estimated to be $168 per ton of treated soil.

Keywords: *Biological industrial waste treatment, *Soils, *Land pollution, *Wood preservatives, Aerobic processes, Soil contamination, Waste water, Water pollution control, Field tests, Aromatic polycyclic hydrocarbons, Cost analysis, Reprints, *BioTrol aqueous treatment system, *BioTrol soil washers, *Slurry bioreactors, *Superfund, SITE program, Phenol/pentachloro.

PB92-150663/REB PC A02/MF A01
U.S. Environmental Protection Agency's SITE Emerging Technology Program: 1991 Update. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
N. M. Lewis, and A. M. Gatchett. cDec 91, 10p EPA/600/J-92/052
Pub. in Jrnl. of the Air and Waste Management Association, v41 n12 p1645-1653 Dec 91. See also report for 1990, PB91-171678.

The Emerging Technology Program (ETP) supports the development of technologies successfully tested at the bench- and pilot-scale level. The ETP is part of the Superfund Innovative Technology Evaluation (SITE) Program which was established in 1986 under the Superfund Amendments and Reauthorization Act (SARA). The goal of the SITE Program is to promote, accelerate, and make commercially available the development and use of alternative/innovative treatment technologies at hazardous waste sites. Technologies are eligible for the ETP Program when sufficient research data exists validating the technologies' basic concepts. The EPA contributes funds to support developers for one or two years. Developers are responsible for conducting research and providing additional financial support in this cooperative research effort. Technologies are categorized into six areas: thermal, chemical, biological, materials handling, physical, and solidification/stabilization. The technologies' performance, development and data collection are documented and evaluated upon completion of the project. The goal is to accelerate the development of new technologies capable of field demonstration and evaluation. Current information on the ETP program, including a brief introduction and description of the program, is presented in the paper. In addition, summaries of the research on the selected 1991 technologies currently being conducted are provided. (Copyright (c) 1991 Air & Waste Management Association.)

Keywords: *Waste treatment, *Superfund, *Hazardous materials, *Technology utilization, US EPA, Funds, Biological treatment, Heat treatment, Materials handling, Physical treatment, Solidification, Stabilization, Field tests, Research and development, Reprints, *Emerging Technology Program, Chemical treatment.

PB92-150671/REB PC A01/MF A01
Health Effects Research Lab., Research Triangle Park, NC.
Direct DNA Sequencing of PCR Products. Journal article.
Environmental Health Research and Testing, Inc., Research Triangle Park, NC.
L. J. Zimmerman, and J. C. Fuscoe. c1991, 5p EPA/600/J-92/053
Pub. in Environmental and Molecular Mutagenesis, v18 n4 p274-276 Nov 91. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

Experiments are described which elucidate some of the technical problems associated with the direct sequencing of polymerase chain reaction (PCR) amplified DNA. Sequencing primer purity, labeling methodology, and template preparation were explored. Conditions are presented for the routine sequencing of single- and double-stranded PCR products. (Copyright (c) 1991 Wiley-Liss, Inc.)

Keywords: *Deoxyribonucleic acids, *Polymerase chain reaction, Hypoxanthine phosphoribosyltransferase, Polyacrylamide gel electrophoresis, Southern blotting, T-lymphocytes, Reprints.

PB92-150689/REB PC A03/MF A01
Overview, Conclusions, and Recommendations of the IPCS Collaborative Study on Complex Mixtures. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
L. D. Claxton, G. Douglas, D. Krewski, J. Lewtas, and H. Matsushita. c1992, 21p EPA/600/J-92/054
Pub. in Mutation Research, v276 n2 p61-80 1992. See also PB88-205380. Prepared in cooperation with Health and Welfare Canada, Ottawa (Ontario), National Inst. of Public Health, Tokyo (Japan), and Pittsburgh Univ., PA.

The International Programme on Chemical Safety (IPCS) and the U.S. EPA sponsored an international collaborative study to examine the variability associated with the extraction and bioassay of Standard Reference Materials (SRMs) that are complex environmental mixtures provided by the U.S. National Institute of Standards and Technology (NIST). The study evaluated the feasibility of establishing bioassay reference values and ranges for the SRMs. Twenty laboratories from North America, Europe, and Japan participated in the study. The bioassay used was the Salmonella/microsomal plate incorporation assay. Repeatability (intralaboratory variance) of the bioassay results ranged from 16% to 88% depending on the SRM and the bioassay conditions (tester strain and metabolic activation); whereas, reproducibility (interlaboratory variance) ranged from 33% to 152%. Between laboratory variability was the main source of variation accounting for approximately 55% to 95% of the total variation for the three environmental samples. Variation in the mutagenic potency of the control compounds was comparable, although the reproducibility of 1-nitropyrene ranged from 127% to 132%.

Keywords: *Mutagens, *Toxic substances, *Mixtures, Bioassay, Salmonella typhimurium, Reproducibility of results, Interlaboratory comparisons, SOS response(Genetics), Mutagenicity tests, Metabolic activation, Reprints, *Standard Reference Materials.

PB92-150697/REB PC A02/MF A01
Design and Implementation of a Collaborative Study of the Mutagenicity of Complex Mixtures in 'Salmonella typhimurium'. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Genetic Toxicology Div.
J. Lewtas, L. D. Claxton, H. S. Rosenkranz, D. Schuetzle, and M. Shelby. c1992, 8p EPA/600/J-92/055
Pub. in Mutation Research, v276 n1 p3-9, 1 Jan 92. See also PB91-154096. Prepared in cooperation with Pittsburgh Univ., PA. Dept. of Environmental and Occupational Health, Ford Motor Co., Dearborn, MI. Scientific and Research Lab., National Inst. of Environmental Health Sciences, Research Triangle Park, NC., and National Inst. of Public Health, Tokyo (Japan).

An international collaborative study of the mutagenicity of complex environmental mixtures in the Ames Salmonella typhimurium mutation assay was performed. The objectives of the study were: (1) to estimate the inter and intra-laboratory variability associated with the extraction of mixtures for bioassay, (2) to estimate the inter and intra-laboratory variability associated with the Salmonella typhimurium bioassay when applied to complex mixtures, (3) to determine if mutagenicity values can be determined from this collaborative study for issuance with standard reference complex mixtures. The complex mixtures used in the study were selected from standard reference materials (SRMs) which had previously been issued by the U.S. NIST as SRMs 1597 (coal tar), SRMs 1649 (diesel particulate matter) and SRMs 1650 (urban air particulate matter) with certified values for polycyclic aromatic hydrocarbons.

Keywords: *Salmonella typhimurium, *Toxic substances, *Mutagens, *Mixtures, *Air pollutants, Mutagenicity tests, Bioassay, Aromatic polycyclic hydrocarbons, Coal tar, Interlaboratory comparisons, Reprints, *Standard Reference Materials.

PB92-150705/REB PC A03/MF A01
Standard Reference Materials for Chemical and Biological Studies of Complex Environmental Samples. Journal article.
Environmental Protection Agency, Research Triangle Park, NC.
W. E. May, B. A. Benner, S. A. Wise, D. Schuetzle, and J. Lewtas. c1992, 14p EPA/600/J-92/056
Pub. in Mutation Research, v276 n1 p11-22 Jan 92. See also PB84-219948, PB87-152021 and PB91-242511. Prepared in cooperation with National Inst. of Standards and Technology, Gaithersburg, MD., and Ford Motor Co., Dearborn, MI.

Standard Reference Materials (SRM's) from the National Institute of Standards and Technology (NIST) are often used in methods development and inter-laboratory comparison studies since they are homogeneous and readily available to the scientific community. SRM 1649 (Urban Dust/Organics), SRM 1650 (Diesel Particulate Matter), and SRM 1597 (Complex Mixture of Polycyclic Aromatic Hydrocarbons from Coal Tar) are three environmental samples which have been used by the scientific community for this purpose. The SRM's were originally developed to assist laboratories

in validating analytical procedures for the determination of polycyclic organic compounds in complex mixtures. In addition, the SRM's have been valuable for the comparison of methodologies for bacterial bioassays and the development of bioassay-directed fractionation and bioassay directed chemical analysis techniques. Most recently the SRM's were chosen for use as test samples in a collaborative study coordinated by the World Health Organization-International Program on Chemical Safety. The paper provides a summary of much of the work to date (published and unpublished) on the chemical and biological characterization of the three SRM's. Information regarding the availability of other NIST SRM's that might be useful for these types of studies will be provided also. (Copyright (c) 1992 Elsevier Science Publishers B.V.)

Keywords: *Chemical analysis, *Bioassay, *Environmental surveys, *Air pollution detection, Solvent extraction, Sampling, Particles, Gravimetry, Aromatic polycyclic hydrocarbons, Concentration(Composition), Exhaust emissions, Coal tar, Urban areas, Fractionation, Thermal analysis, Reprints, *Standard reference materials, National Institute of Standards and Technology, SRM 1649, SRM 1597, SRM 1650.

PB92-150713/REB PC **A03/MF A01**
Sources of Variation in the Mutagenic Potency of Complex Chemical Mixtures Based on the Salmonella/Microsome Assay. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
D. Krewski, B. G. Leroux, J. Creason, and L. Claxton. c1992, 28p EPA/600/J-92/057
Pub. in Mutation Research, v276 n1 p33-59 Jan 92. See also PB84-244151 and PB88-205380. Prepared in cooperation with Health and Welfare Canada, Ottawa (Ontario). Environmental Health Centre, and Carleton Univ., Ottawa (Ontario). Dept. of Mathematics and Statistics.

Twenty laboratories worldwide participated in a collaborative trial sponsored by the International Pprgram on Chemical Safety on the mutagenicity of complex mixtures as expressed in the Salmonella/microsome assay. The U.S. National Institute of Standards and Technology provided homogeneous reference samples of urban air and diesel particles and a coal tar solution to each participating laboratory, along with samples of benzo(a)pyrene and 1-nitropyrene which served as positive controls. Mutagenic potency was characterized by the slope of the initial linear component of the dose response curve. Analysis of variance revealed significant interlaboratory variation in mutagenic potency, which accounted for 57-96% of the total variance on a logarithmic scale, depending on the sample, strain and activation conditions. No significant differences were noted in the average potency reported for air and diesel particles between laboratories using soxhlet extracts and those using sonication, although there was larger interlaboratory variation for the soxhlet method.

Keywords: *Mutagenicity tests, *Mixtures, *Toxic substances, *Salmonella typhimurium, *Microsomes, Interlaboratory comparisons, Air pollutants, Tables(Data), Reproducibility of results, Test methods, Coal tar, Diesel fuels, Reprints.

PB92-150721/REB PC **A03/MF A01**
Results of the IPCS Collaborative Study on Complex Mixtures. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
L. D. Claxton, J. Creason, B. Leroux, E. Agurell, and S. Bagley. c1992, 12p EPA/600/J-92/058
Pub. in Mutation Research, v276 n1 p23-32, 1 Jan 92. Prepared in cooperation with Health and Welfare Canada, Ottawa (Ontario). Environmental Health Centre, Stockholm Univ. (Sweden), McMaster Univ., Hamilton (Ontario), and Laboratoire d'Hygiene de la Ville de Paris (France).

The International Program on Chemical Safety (IPCS) sponsored a collaborative study to examine the intra- and interlaboratory variation associated with the preparation and bioassay of complex chemical mixtures. The mixtures selected were National Institute of Standards and Technology (NIST) Standard Reference Materials (SRM). Twenty laboratories worldwide participated in the study. The participating laboratories extracted the organic portion of two particulate samples--an air particulate sample and a diesel particulate sample--and bioassayed the extracts. The laboratories simultaneously bioassayed a NIST-prepared extract of coal tar and two control compounds (benzo(a)pyrene, and 1-nitropyrene). The bioassay method used was the Salmonella/mammalian microsome plate-incorporation test using strains TA98 and TA100. Study design also allowed for a comparison of sonication and Soxhlet extraction techniques. The particulates samples were mutagenic in both strains with and without activation in all twenty laboratories. The paper provides a complete summary of the data collected during the collaborative study.

Keywords: *Mixtures, *Toxic substances, *Mutagenicity tests, Interlaboratory comparisons, Bioassay, Environmental pollutants, Air pollutants, Tables(Data), Salmonella typhimurium, Benzo(a)pyrene, Coal tar, Diesel fuels, Reprints.

PB92-150739/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Carcinogenesis and Metabolism Branch.
DNA Adducts of the Antitumor Agent Diaziquone. Journal article.
Kentucky Univ., Lexington.
R. C. Gupta, A. Garg, K. Earley, S. C. Agarwal, and G. R. Lambert. c1992, 9p EPA/600/J-92/059
Grant EPA-R-813840, Contract EPA-68-02-4456
Pub. in Jnl. of Cancer Research, v51 p5198-5204, 1 Oct 91. See also PB89-134704. Prepared in cooperation with Environmental Health Research and Testing, Inc., Research Triangle Park, NC. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Carcinogenesis and Metabolism Branch.

A study evaluated adduct formation of the antineoplastic agent diaziquone with DNA and nucleotides in vitro. The aziridine moieties of AZQ can be expected to interact covalently with DNA which in turn presumably elicit the antitumor activity. The authors analyzed AZQ-DNA adducts by a modified 32p-postlabeling assay involving purification of the nuclease P1-enriched labeled adducts by high-salt C18 reversed-phase TLC and separation of the eluted adducts on a PEI-cellulose layer using non-urea salt solutions. Modification of calf thymus DNA with AZQ produced two major (22% and 40%) and at least eight minor adducts. At equal concentrations of AZQ and DNA (1 microgram/ul each), peak binding was observed in about 2 h (1,926 plus or minus 378 fmol/microgram DNA) with the binding levels remaining practically unchanged through 4 h. However, incubation for 24 h resulted in over 40% decline, indicating adduct instability. AZQ was found to be highly reactive in vitro as evidenced by its substantial binding (49 plus or minus 14 fmol/microgram DNA) even at a DNA:AZQ ratio of 100:1. When incubated with mononucleotides, AZQ reacted extensively with adenine, guanine, and cytosine but only slightly with thymine.

Keywords: *Antineoplastic agents, *DNA damage, *Toxicity, Thin layer chromatography, Nucleotides, Cross-linking reagents, Mass spectroscopy, Phosphorus 32, In vitro analysis, Reprints.

PB92-150747/REB PC **A03/MF A01**
Disposition of 2,3,7,8-Tetrabromodibenzo-p-Dioxin and 2,3,7,8-Tetrachlorodibenzo-p-dioxin in the Rat: Biliary Excretion and Induction of Cytochromes CYP1A1 and CYP1A2. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
L. B. Kedderis, J. J. Diliberto, P. Linko, J. A. Goldstein, and L. S. Birnbaum. c1992, 12p EPA/600/J-92/060
Pub. in Toxicology and Applied Pharmacology, v111 n1 p163-172 Oct 91. See also PB91-211466. Prepared in cooperation with North Carolina Univ. at Chapel Hill, and National Inst. of Environmental Health Sciences, Research Triangle Park, NC.

The biologic activity and pharmacokinetic properties of 2,3,7,8-tetrabromodibenzo-p-dioxin (TBDD) are similar to those of the chlorinated congener, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Metabolism of both compounds appears to be rate-limiting for excretion, which is primarily via the feces. Therefore, the biliary elimination of TBDD and TCDD was examined as an indirect assessment of metabolism. Male F344 rats were anesthetized with pentobarbital, and 1 nmol/kg (3H)TBDD or (3H)TCDD was administered iv. Bile was collected for up to 8 hr while rats were maintained under anesthesia. In a second set of studies, the dose-response profiles for induction of cytochromes CYP1A1 and CYP1A2 by TBDD were characterized. The ED50 value for CYP1A1 induction (measured by ethoxyresorufin O-deethylase activity and radioimmunoassay (RIA)) was estimated to be 0.8-1.0 nmol/kg, similar to what has been reported for TCDD. Induction of CYP1A2 (RIA) by TBDD appeared to be a more sensitive response over the dose range studied. Finally, comparison of hepatic CYP1A2 induction vs hepatic concentrations of TBDD 3 days following treatment with 10 vs 1 nmol/kg TBDD suggested that induction of CYP1A2 alone may not account for nonlinearities in dioxin disposition exemplified by dose-related increases in the ratio of dioxin concentrations in liver and adipose tissue.

Keywords: *Pharmacokinetics, *Bile, *Enzyme induction, *Cytochromes, *Tetrachlorodibenzodioxin, *Toxicology, Feces, Liquid chromatography, Radioimmunoassay, Rats, Dose-response relationships, Liver, Adipose tissue, Reprints, *Tetrabromodibenzodioxins.

PB92-150754/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC.
Utility of Light Scatter in the Morphological Analysis of Sperm. Journal article.
ManTech Environmental Technology, Inc., Research Triangle Park, NC.
R. M. Zucker, S. D. Perreault, and K. H. Elstein. c1992, 11p EPA/600/J-92/061
Contract EPA-68-02-4450
Pub. in Cytometry, v13 n1 p39-47 Jan 92. See also PB89-110472. Sponsored by Environmental Protection Agency, Research Triangle Park, NC.

A study differentiated the morphologically diverse sperm nuclei of four animal species by using an Ortho flow cytometer to detect the forward light scatter from a red (helium-neon) laser. Cytograms depicting the axial light loss and forward red scatter signals revealed unique, but reproducible, sigmoid distributions that reflected not only interspecies differences in shape and size, but variations in particle refractive index and orientation within the flow cell at the time of analysis. Consequently, the authors were able to use regional gating of the light scatter cytogram to minimize the influence of orientation on the resolution of the fluorescence signal. The authors also observed that sperm enlarging as a result of chemically induced decondensation exhibit over time a biphasic shift (increase, then decrease) in light scatter at a species-dependent rate. These results suggest that, without any special adaptations to the flow cytometer, light-scatter parameters can be used to discriminate morphologically different sperm, to enhance the resolution of fluorescence measurements that may otherwise be confounded by variability in radial orientation, and to detect alterations in the rate of a biochemical/biophysical process such as decondensation.

Keywords: *Spermatozoa, *Light scattering, *Cell morphology, Flow cytometry, Lasers, Fluorescence, Biophysics, Animals, Deoxyribonucleic acids, Species specificity, Refractivity, Reprints.

PB92-150762/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Carcinogenesis and Metabolism Branch.
Morphological Transformation and DNA Adduct Formation by Benz(j)aceanthrylene and Its Metabolites in C3H10T1/2CL8 Cells: Evidence for Both Cyclopenta-Ring and Bay-Region Metabolic Activation Pathways. Journal article.
Environmental Health Research and Testing, Inc., Research Triangle Park, NC.
S. Nesnow, J. Lasley, S. Curti, J. Ross, and G. Nelson. c1991, 8p EPA/600/J-92/062
Contract EPA-68-02 4456
Pub. in Jnl. of Cancer Research, v51 p6163-6169, 15 Nov 91. See also PB85-124709, PB89-109797 and PB90-103458. Prepared in cooperation with North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Carcinogenesis and Metabolism Branch.

Benz(j)aceanthrylene (B(j)A), a cyclopenta-fused polycyclic aromatic hydrocarbon related to 3-methylcholanthrene, has been studied to identify the major routes of metabolic activation in transformable C3H10T1/2CL8(C3H10T1/2) mouse embryo fibroblasts in culture. Previous studies have reported that the major (55% of total) B(j)A metabolite formed by C3H10T1/2 cells was (+ or -)-trans-9,10-dihydroxy-B(j)A(B(jA-9,10-diol), the dihydrodiol in the bay-region

ring, with moderate amounts (14% of total) of (+ or -)-trans-1,2-dihydro-1,2-dihydroxy-B(j)A (B(j)A-1,2-diol), the cyclopenta-ring dihydrodiol. Qualitative and quantitative analysis of the postlabeling data suggests that B(j)A is metabolically activated by two distinct routes, the bay-region diol-epoxide route and the cyclopenta-ring oxide route, the former being the most significant.

Keywords: *Mutagens, *DNA adducts, *Metabolism, *Aromatic polycyclic hydrocarbons, Cultured cells, Metabolic activation, Phosphorus 32, Cell survival, Cell morphology, Thin layer chromatography, Reprints.

PB92-150770/REB PC A03/MF A01
Effects of NGF and Fetal Cell Transplants on Spatial Learning after Intradentate Administration of Colchicine. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Neurotoxicology Div.
S. Barone, P. Tandon, J. F. McGinty, and H. A. Tilson.
c1991, 15p EPA/600/J-92/063
Pub. in Experimental Neurology, v114 n3 p351-363, 1 Dec 91. See also PB91-211508. Prepared in cooperation with East Carolina Univ. School of Medicine, Greenville, NC.

The study was performed to assess the effects of NGF infusion alone or in combination with fetal hippocampal transplants on recovery of function after damage to hippocampal dentate granule cells. Two groups of male Fischer-344 rats received bilateral infusions of colchicine (COLCH; 2.5 microgram/site) or artificial cerebrospinal fluid (ACSF; 0.5 microliter) through chronic indwelling cannulae into the dentate gyrus. At the time of COLCH injection, a unilateral intracerebroventricular (ICV) cannula was implanted. Morphological examination performed after behavioral testing confirmed the presence of viable transplants and COLCH-induced granule cell loss. These data demonstrate a time-dependent facilitative effect of exogenously applied NGF on functional deficiencies produced by experimentally induced neurodegeneration in the dentate gyrus of the hippocampus.

Keywords: *Colchicine, *Nerve growth factors, *Fetal tissue transplantation, *Spatial behavior, Cerebellar nuclei, Hippocampus, Immunohistochemistry, Acetylcholinesterase, Enkephalins, Reprints.

PB92-150788/REB PC A03/MF A01
Effect of Inhaled Methanol on Pituitary and Testicular Hormones in Chamber Acclimated and Non-Acclimated Rats.
Environmental Protection Agency, Research Triangle Park, NC. Reproductive Toxicology Branch.
R. L. Cooper, M. L. Mole, G. L. Rehnberg, J. M. Goldman, and W. K. McElroy. c1992, 15p EPA/600/J-92/064
Pub. in Toxicology, 71 n1 p69-81, Jan 92. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC.

Two experiments were conducted to evaluate the effects of methanol (MEOH) on the serum hormones associated with reproductive function in the male rat. First, rats were exposed to MEOH for 6 hs and killed immediately or 24 hs later. The effect of the handling associated with placing the rat in the exposure chamber was also evaluated by comparing hormonal changes in sham- and MEOH-exposed groups acclimated (A) for two weeks with groups that were not acclimated (N-A). At 6 h, serum LH in sham-exposed, NA rats was significantly greater than in sham-exposed, A rats. 5,000 ppm MEOH significantly reduced serum LH in the N-A rats, while 10,000 ppm significantly increased serum LH in the A rats. Serum FSH and testosterone (T) were not different at 6 h. At 24 h, serum LH in A rats exposed to 10,000 ppm MEOH was greater than sham-exposed rats. Also, concentrations of serum and interstitial fluid (IF) T in the N-A rats at 24 h was generally greater than that observed in A rats. Serum and IF T in the A rats exposed to 10,000 ppm was lower, while serum and IF T in N-A rats was greater after exposure to 5,000 ppm and 10,000 ppm, respectively. In a second experiment, groups of A and N-A rats were exposed to 5000 ppm MEOH for 1, 2 or 6 h and killed immediately. Serum LH, T and corticosterone concentrations in sham- and MEOH-exposed rats were similar at all time points. However, the concentrations of LH and T in the N-A rats were greater than A rats after 1 and 6 h exposure, while that of corticosterone was greater at 1 and 6 h.

Keywords: *Pituitary hormones, *Carbinols, *Testis, *Toxicity, Respiration, Prolactin, Reproduction(Biology), Testosterone, LH, FSH, Reprints.

PB92-150796/REB PC A03/MF A01
Fungicide Benomyl(Methyl 1-(Butylcarbamoyl)-2-Benzimidazolecarbamate) Causes Testicular Dysfunction by Inducing the Sloughing of Germ Cells and Occlusion of Efferent Ductules. Journal article.
Illinois Univ. at Urbana-Champaign. Dept. of Veterinary Biosciences.
R. A. Hess, B. J. Moore, J. Forrer, R. E. Linder, and A. A. Abuel-Atta. c1991, 15p EPA/600/J-92-065
Pub. in Fundamental and Applied Toxicology, v17 n4 p733-745, Nov 91. See also PB82-249293 and PB90-103128. Prepared in cooperation with Environmental Protection Agency, Research Triangle Park, NC. Reproductive Toxicology Branch.

Adult male Sprague-Dawley rats (100 days of age) were given single oral doses of the fungicide benomyl (methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate) in dosages ranging from 25 to 800 mg/kg body weight. The testis and excurrent ducts were examined at 2 and 70 days posttreatment to determine the chemical effects on spermatogenesis and the epididymis. Primary effects seen at 2 days postexposure were testicular swelling and occlusions of the efferent ductules. Mean testis weight peaked with 400 mg/kg. Premature release of germ cells (sloughing), detected even with the lowest dosage (25 mg/kg), was the most sensitive short-term response to benomyl. Sloughing was found primarily in Stage VII of the spermatogenic cycle at the lower dosages, but at higher dosages sloughing extended into all stages except for Stages VIII-XI. Only a few testes were found to be completely regressed. Occlusion of efferent ductules and disruption of the seminiferous epithelium by sloughing of germ cells are overlapping dose-dependent mechanisms responsible for short- and long-term effects of benomyl on the rat testis.

Keywords: *Toxicity, *Fungicides, *Testis, *Seminiferous tubules, Edema, Dose-response relationships, Rats, Spermatids, Reproductive system, Reprints, *Benomyl.

PB92-150804/REB PC A02/MF A01
In vitro/In vivo Comparison of Yolk-Sac Function and Embryo Development. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
J. E. Andrews, M. Ebron-McCoy, R. M. Zucker, K. H. Elstein, and J. M. Rogers. c1991, 8p EPA/600/J-92/066
Contract EPA-68-02-4450
Pub. in Toxicology In vitro, v6 n1 p1-6 Jan 92. See also PB90-220773. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC.

The yolk-sac function and development of rat embryos grown in vitro for 24hr, starting on day 10.5, were compared with those of embryos grown in utero. The embryos grown in vitro had significantly fewer somites, shorter crown-rump length and smaller yolk-sac diameter when compared with the embryos grown in vivo but all values were within the normal range for this stage of gestation. Head length was not significantly different between the two groups. The cellular and nuclear volumes (Coulter counter) of nucleated yolk-sac red blood cells did not differ significantly between the two groups. RBC cell-cycle analyses by flow cytometry did not reveal any difference between in vitro and in vivo embryos. The clinical chemistries of embryo-yolk-sac homogenates were compared. Protein, triglyceride, lactate dehydrogenase, cholesterol, urea nitrogen and glutamic-oxalacetic transaminase concentrations did not differ significantly between the two groups. These data indicate that impaired yolk-sac function could, in part, be responsible for the developmental delays and the short survival times of cultured embryos.

Keywords: *Embryos, *Yolk sac, *Teratogens, Rats, In vitro analysis, In vivo analysis, Mutagenicity tests, Gamma-glutamyltransferase, Alpha fetoproteins, Clinical chemistry, Reprints.

PB92-150812/REB PC A03/MF A01
Host Resistance to Murine Malaria in Mice Exposed to the Adenosine Deaminase Inhibitor, 2'-Deoxycoformycin. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
R. W. Luebke, D. L. Andrews, C. B. Copeland, M. M. Riddle, and R. R. Rogers. c1991, 13p EPA/600/J-92/067
Pub. in International Jnl. of Immunopharmacology, v13 n7 p987-997 Oct 91. See also PB84-238666, PB85-198810 and PB89-105688. Prepared in cooperation with Northrop Services, Inc., Research Triangle Park, NC.

Resistance to infection with the nonlethal rodent malaria parasite Plasmodium yoelii 17XNL (Py17XNL) is mediated by humoral, T-cell and accessory cell activity. The purpose of the study was to profile host resistance to infection with this organism in mice exposed to 2-deoxycoformycin (2dCF), a potent adenosine deaminase (ADA) inhibitor. Inhibition of ADA activity by 2dFC results in defective T-cell function and either suppression or augmentation of the humoral response, depending on whether 2dCF exposure precedes (suppression) or follows (augmentation) immunization. In the study, mice injected with 2dCF during the first five days of infection cleared the infection at the same time as controls, but had lower peak parasitemia than controls. Mice infected with the lethal variant of P. yoelii were more susceptible to infection when injected with 2dCF after infection, suggesting that 2dCF injection did not directly affect the parasite. Rather, suppression of parasitemia in 2dCF-treated mice may have been mediated by augmented humoral immunity, since 2dCF injection increases antibody responses when 2dCF injection follows antigen (in this case, parasite) injection. Conversely, in mice given 2dCF prior to infection, parasitemia peaked 2 days later and was eliminated more gradually than in control mice. These results indicate that 2dCF, given before or after infection, alters the host response to infection with Py17XNL. It appears that a combination of increased macrophage activity and altered T-cell activity contributed to the delay in peak parasitemia and clearance of infection in mice exposed to 2dCF before infection with Py17XNL.

Keywords: *Malaria, *Adenosine deaminase, *Pentostatin, Host-parasite relations, Phagocytosis, Natural killer cells, Antibody formation, Tilorone, Interferons, Reprints.

PB92-150820/REB PC A03/MF A01
Computational Studies of the 3-Dimensional Structure of Cyclopenta Polycyclic Aromatic Hydrocarbons Containing a Gulf Region. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Carcinogenesis and Metabolism Branch.
R. E. Venegas, P. H. Reggio, and J. R. Rabinowitz. c1992, 22p EPA/600/J-92/068
Pub. in International Jnl. of Quantum Chemistry, v41 n4 p497-516 Dec 91. See also PB91-191536. Prepared in cooperation with Kennesaw State Coll., Marietta, GA.

Recently, some cyclopenta-fused polyaromatic hydrocarbons, an environmentally relevant subclass of chemicals, have been shown to have carcinogenic activity in animals. It has been suggested that benz(l)aceanthrylene (l), an active member of this subclass with a gulf region, has a trans dihydrodiol metabolite that is nonplanar and has two distinct spatial configurations. The authors have used MMP2(85) and AM1 to investigate the three-dimensional structure of the dihydrodiol and other similar derivatives of (l) and have found that although (l) is somewhat nonplanar the relevant derivatives are all nearly planar. Further, the authors have computed potential functions for the bending of the angular ring in the gulf region using MMP2(85), AM1, and ab initio computed energies for AM1 spatial configurartions and find that these molecules all have only a single potential minimum. The authors have performed the same calculations for benzo(c)phenanthrene and its 1,12 dimethyl derivative, molecules with a similar gulf region for which crystallographic data exists. In agreement with that data, the authors find that two distinct spatial configurations exist separated by significant barriers. The differences between the results generated by the three different methods of computation are discussed. (Copyright (c) 1992 John Wiley and Sons, Inc.)

Keywords: *Molecular structure, *Polycyclic aromatic hydrocarbons, *Carcinogens, Deoxyribonucleic acids, Environmental pollutants, Phenanthrenes, Crystallography, Reprints.

PB92-150838/REB PC **A03**/MF **A01**
Assessing Developmental Hazard: The Reliability of the A/D Ratio. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
R. W. Setzer, and J. M. Rogers. c1991, 15p EPA/600/J-92/069
Pub. in Teratology, v44 n6 p653-665 Dec 91. See also PB89-105597.

The quantitative relationship between developmentally toxic exposure levels and adult toxic exposure levels has been used as an index of developmental hazard and has figured prominently in discussions of legal regulation of developmentally toxic agents. The authors explored some quantitative aspects of the A/D ratio and of the concept of developmental hazard by simulating 661,500 mammalian developmental toxicity assays on 441 hypothetical compounds. In study simulations, A/D often varied substantially among replicate assays: the median ratio of the upper and lower limits of the distribution of A/D values that include about 95% of the observed A/D values is 16. In addition, A/D did a poor job of predicting the relative developmental and adult responses at dosages lower than those used to calculate the index: among simulated compounds with A/Ds of about 1.0, the developmental response at 1/100th of the NOAEL ranged from about 0.1% to 20,000% of the adult response. It seems likely that no single index can quantify 'developmental hazard,' as defined by relative adult and developmental susceptibility, and more effort needs to be expended in refining the concept if it is to be useful for hazard assessment.

Keywords: *Toxicity, *Health hazards, *Teratogens, Risk assessment, Dose-response relationships, Fetus, Body weight, Weight gain, Mothers, Reprints.

PB92-150846/REB PC **A03**/MF **A01**
Relationships between Lung Function and Physical Characteristics in Young Adult Black and White Males and Females. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Clinical Research Branch.
W. F. McDonnell, and E. Seal. c1991, 13p EPA/600/J-92/070
Pub. in European Respiratory Jnl., v4 p279-289 1991.

The relationships of lung function to physical characteristics in young adults have not been adequately described for different gender-race groups in the United States. As part of a study of the effects of ozone exposure upon Black and White men and women, the authors measured lung volumes, expiratory flow rates, and airway resistance on a sample of 314 healthy 18-35 yr old nonsmokers. Regression analysis indicated that lung function was adequately described as a linear function of either height or sitting height in each of the four groups, and that while not always significant, gender and race differences in the height and sitting height coefficients were consistently present with those of males and Whites larger than those of females and Blacks, respectively. Lung volumes were frequently observed to be associated with body mass index as measured by Quetelet Index. The best fitting gender-race specific multiple regression models including these terms and occasional age terms are presented.

Keywords: *Black Americans, *White Americans, *Respiratory function tests, Sex factors, Spirometry, Regression analysis, Airway resistance, Ozone exposure, Reprints, Nonsmokers.

PB92-150853/REB PC **A03**/MF **A01**
90-Day Toxicity Study of Dichloroacetate in Dogs. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
J. L. Cicmanec, L. W. Condie, G. R. Olson, and S. R. Wang. c1991, 16p EPA/600/J-92/071
Pub. in Fundamental and Applied Toxicology, v17 n2 p376-389 Aug 91. Prepared in cooperation with Pathology Associates, Inc., West Chester, OH., and Computer Sciences Corp., Cincinnati, OH.

Male and female juvenile beagle dogs were dosed daily for 90 days with dichloroacetate (DCA). The compound was administered orally via gelatin capsules at doses of 0, 12.5, 39.5, and 72 mg/kg/day. Each dose group consisted of five males and five females. The dogs were observed clinically and blood samples were taken at 15-day intervals for hematologic and serum chemistry values. Decreased total erythrocyte count and hemoglobin levels were observed in mid- and high-dose dogs beginning at Day 30. Serum concentrations of LDH were elevated at Days 30 and 45 in females and at Day 75 in males treated with DCA at 72 mg/kg/day. Degeneration of testicular germinal epithelium and syncytial giant cell formation was noted in males of all dose groups. Hepatic vacuolar change and chronic hepatitis appeared only in DCA-treated dogs. In addition, suppurative bronchopneumonia and chronic pancreatitis were noted in many high-dose and some middose subjects. A no-adverse-effect level was not determined in the study.

Keywords: *Dichloroacetate, *Toxicity, *Water pollution effects(Animals), Dogs, Lactate dehydrogenase, Brain, Testis, Giant cells, Toxic hepatitis, Hemoglobins, Pancreatitis, Pneumonia, Erythrocytes, Pathology, Body weight, Organ weight, Gallbladder, Reprints.

PB92-150861/REB PC **A03**/MF **A01**
Myelin Basic Protein-Messenger RNA (MBP-mRNA) Expression during Triethyltin-Induced Myelin Edema. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
B. Veronesi, K. Jones, S. Gupta, J. Pringle, and C. Mezei. c1991, 14p EPA/600/J-92/072
Pub. in Neurotoxicology, v12 n2 p265-276 Jul 91. See also PB91-231274. Prepared in cooperation with Dalhousie Univ., Halifax (Nova Scotia). Dept. of Biochemistry.

Triethyltin (TET) is a neurotoxicant that produces severe but transient cerebral edema, characterized ultrastructurally by vacuolation of the intraperiod line of central nervous system (CNS) myelin. In the present study, the genomic expression (i.e., mRNA) of MBP was monitored throughout the pathogenesis of TET-induced myelin edema and recovery in Sprague-Dawley rats given a single injection of a neuropathic (8.0 mg/kg) or non-neuropathic (0.8 mg/kg) dose of TET-bromide. Levels of MBP-mRNA from the anterior and posterior brain were collected 1 hr, 3 hr, 2d, and 7d, postexposure. The optic nerve andd caudal brainstem, representing anterior and posterior brain sites, respectively, were examined at the same time-points for ultrastructural evidence of edema and recovery. Study data indicate that neuropathic doses (8.0 mg/kg) of TET significantly stimulated MBP transcript throughout the brain at all exposure time-points. The magnitude and time-course of this stimulation differed in the anterior and posterior brain, with the latter region showing higher levels of MBP-mRNA.

Keywords: *Encephalitogenic basic proteins, *Messenger RNA, *Gene expression, *Edema, *Trimethyltin compounds, *Toxicity, Rats, Brain, Nucleic acid hybridization, Northern blotting, Electron microscopy, DNA probes, Optic nerve, Reprints.

PB92-150879/REB PC **A03**/MF **A01**
Concentration-Time Models for the Effects of Ozone on Bronchoalveolar Lavage Fluid Protein from Rats and Guinea Pigs. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
J. W. Highfill, G. E. Hatch, R. Slade, R. B. Devlin, and D. L. Costa. c1992, 18p EPA/600/J-92/073
Pub. in Inhalation Toxicology, v4 n1 p1-16, 1 Jan 92. See also PB89-129050 and PB91-207126.

Questions about the adequacy of the existing ozone (O3) standard prompted an examination of relationships between concentration (C) and exposure time (T) and the impact of changes in the C x T product on toxic responses. Using protein concentration of bronchoalveolar lavage fluid (BALP) as an index of O3-induced lung damage, models were developed from a matrix of C (0.0, 0.1, 0.2, 0.4, and 0.8 ppm) and T (2, 4, and 8 h) values in rat and guinea pig. Equal C x T products with different levels of C and T were incorporated into the protocol. Polynomial and exponential least-squares models were developed and the lognormal linear model (Larsen et al., 1991) was evaluated for the rat and guinea pig data. For equal C x T products the results showed similar BALP responses at low C x T products. Calculations from the data and the models showed that (1) the models were consistent with reported experiments from the author's laboratory (Hatch et al., 1986), (2) exercising humans were more responsive to O3 exposure (without adjustments for ventilation rates) than were either rats or guinea pigs as measured by changes in BALP (Koren et al., 1989), and (3) the exponential model provided more generality than Haber's law by providing estimates of BALP levels for various C x T. (Copyright (c) 1992 by Hemisphere Publishing Corporation.)

Keywords: *Air pollution effects(Animals), *Ozone, *Proteins, Rats, Guinea pigs, Biochemistry, Reprints, *Bronchoalveolar lavage fluid.

PB92-150887/REB PC **A02**/MF **A01**
Effects of Chemically Induced Maternal Toxicity on Prenatal Development in the Rat. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Developmental Toxicology Div.
N. Chernoff, R. W. Setzer, D. B. Miller, M. B. Rosen, and J. M. Rogers. c1990, 10p EPA/600/J-92/074
Pub. in Teratology, v42 n6 p651-658 Dec 90. See also PB89-103980. Prepared in cooperation with Northrop Services, Inc., Research Triangle Park, NC.

The hypothesis that chemically induced overt maternal toxicity induces a characteristics syndrome of adverse developmental effects in the rat was investigated. Pregnant animals (Sprague-Dawley strain) were dosed by oral gavage with one of a series of compounds on days 6-15 of gestation. These chemicals were diquat (DIQ), ethylene-bis-isothiocyanate (EBIS), toxaphene (TOX), styrene (STY), 2,4-dichlorophenoxyacetic acid (2,4-D), 2,4,5-trichlorophenol (2,4,5-Tr), triphenyl tin hydroxide (TPTH), and cacodylic acid (CAC). Significant maternal weight reductions were noted during the course of treatment with all compounds except CAC and 2,4,5-Tr. Maternal lethality was produced by EBIS, TOX, 2,4,-D, and 2,4,5-Tr. The main treatment-related developmental toxicity noted in litters at term consisted of increased lethality (EBIS, TPTH) and decreased fetal weight (EBIS and CAC). Treatment-related anomalies were seen in litters treated with 2,4-D and TOX (supernumerary ribs) and with EBIS and STY (enlarged renal pelvis). No significant developmental effects were produced with DIQ, or 2,4,5-Tr. The study indicates that overt maternal toxicity as defined by weight loss or mortality is not always associated with the same defined syndrome of adverse developmental effects in the rat.

Keywords: *Teratogens, *Toxicity, *Fetal development, Maternal-fetal exchange, Diquat, Toxaphene, Styrene, Organotin compounds, Cacodylic acid, Dose-response relationships, Reprints, Rats, Supernumerary ribs, Ethylene-bis-isothiocyanate, Dichlorophenoxyacetic acids, Trichlorophenols.

PB92-150895/REB PC **A03**/MF **A01**
Effect of Pentachlorophenol on the Activation of 2,6-Dinitrotoluene to Genotoxic Urinary Metabolites in CD-1 Mice: A Comparison of GI Enzyme Activities and Urine Mutagenicity. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
S. E. George, R. W. Chadwick, J. P. Creason, M. J. Kohan, and J. P. Dekker. c1991, 12p EPA/600/J-92/075
Pub. in Molecular and Environmental Mutagenesis, v18 n4 p92-101 Aug 91. See also PB89-216535. Prepared in cooperation with Environmental Health Research and Testing, Inc., Research Triangle Park, NC.

2,6-Dinitrotoluene (2,6-DNT) and pentachlorophenol (PCP) are used for industrial purposes and are found in the environment as hazardous contaminants. Because concurrent exposure to both compounds can occur, it is of interest to determine if organochlorine compounds potentiate the effect of nitroaromatic chemicals. CD-1 mice were treated with PCP (42.8 mg/kg) for 4 weeks. On weeks 1,2, and 4 after the initial PCP dose, mice were treated p.o. with 2,6-DNT (75 mg/kg) and 24 hr urines were collected. After concentration, the urines were tested for their mutagenic activity in Salmonella typhimurium strain TA98 without metabolic activation in a microsuspension bioassay. A significant increase ($P < .05$) in mutagenicity was observed in urines from mice treated with 2,6-DNT alone and in combination with PCP. By week 4, mice that received both 2,6-DNT and PCP excreted urine that was more

mutagenic than that from animals which received only 2,6-DNT. At weeks 2 and 4, mice were sacrificed and intestinal enzyme activities (nitroreductase, azo reductase, Beta-glucuronidase, dechlorinase, and dehydrochlorinase) were quantitated. (Copyright (c) 1991 Wiley-Liss, Inc.)

Keywords: *Mutagens, *Metabolic activation, Salmonella typhimurium, Mutagenicity tests, Urine, Bioassay, Intestines, Enzymes, Organ weight, Multivariate analysis, Reprints, *Pentachlorophenol, *Dinitrotoluenes.

PB92-151547/REB PC **E99/MF E99**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Emissions of Metals, Chromium and Nickel Species, and Organics from Municipal Wastewater Sludge Incinerators.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
Mar 92, 1897p-in 9v
Set includes PB92-151554 through PB92-151638. See also PB91-151472. Prepared in cooperation with DEECO, Inc., Cary, NC., and Lewis (F. Michael), Mountain View, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

No abstract available.

PB92-151554/REB PC **A04/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Emissions of Metals, Chromium and Nickel Species, and Organics from Municipal Wastewater Sludge Incinerators. Volume 1. Summary Report. Final rept. 1989-91.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
R. R. Segall, W. G. DeWees, and F. M. Lewis. Mar 92, 61p EPA/600/R-92/003A
Contracts EPA-68-CO-0027, EPA-68-02-4442
See also Volume 2, PB92-151562. Prepared in cooperation with DEECO, Inc., Cary, NC., and Lewis (F. Michael), Mountain View, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Also available in set of 9 reports PC E99/MF E99, PB92-151547.

At Site 5 (continuing a numbering system initiated in a previous 4-site project) tests were only conducted for methods development purposes. At Site 6, emissions were measured at the inlet and outlet of the control device. At Site 7, an evaluation of CO and THC CEMSs was performed. At Sites 8 and 9, emissions were measured at the inlet of the venturi scrubber, at the midpoint located between the venturi scrubber and the wet ESP, and at the outlet of the wet ESP. For Sites 6, 8, and 9, midpoint and outlet air emission samples were collected and analyzed for particulate matter, metals, PCDD/PCDFs, volatile and semivolatile compounds (except Site 6), and hexavalent chromium and nickel subsulfide species. Continuous emission monitoring (CEM) for O2, CO2, CO, SO2, and NOx at the control system inlet and O2 (except Site 6), CO2 (except Sites 6 and 9), CO, SO2 (except Sites 6 and 9), NOx (except Sites 6 and 9), and THC was conducted at the control system outlet stack. The metals found in the greatest concentration in the sludge were lead, chromium and nickel. The need for sampling of hexavalent chromium without artifact formation and analysis of the resulting samples specifically for hexavalent chromium at low concentrations was a major accomplishment of the test program. The results of the nickel sampling and analysis indicate that within the detection limit of the wet chemical method, no nickel subsulfide was present in the air emissions. At Site 6 and Site 9, a positive correlation between carbon monoxide emissions and total hydrocarbon (THC) emissions was observed. At Site 7, a positive correlation was demonstrated between the 'Hot' and 'Cold' THC CEMs.

Keywords: *Sewage sludge, *Sludge disposal, *Incineration, *Air pollution sampling, Site surveys, Combustion products, Air pollution control equipment, Metals, Chromium, Nickel, Organic compounds, Air pollution detection, Hydrocarbons, Electrostatic precipitators, Scrubbers, Concentration(Composition), Air pollution standards, Pollution regulations, Municipal wastes, Air pollution control, Continuous sampling.

PB92-151562/REB PC **A05/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Emissions of Metals, Chromium and Nickel Species, and Organics from Municipal Wastewater Sludge Incinerators. Volume 2. Site 5 Emission Test Report Hexavalent Chromium Method Evaluation. Final rept. 1989-91.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
W. G. DeWees, and R. R. Segall. Mar 92, 89p EPA/600/R-92/003B
Contract EPA-68-CO-0027
See also Volume 1, PB92-151554 and Volume 3, PB92-151570. Prepared in cooperation with DEECO, Inc., Cary, NC., and Lewis (F. Michael), Mountain View, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Also available in set of 9 reports PC E99/MF E99, PB92-151547.

At Site 5, three candidate sampling methods and two candidate analytical methods for hexavalent chromium were assessed. The conversion of hexavalent chromium (Cr (+6)) to other valence states of chromium during sampling and sample storage was of primary concern. Method 5-type samples and impinger train samples were collected by PEI Associates, Inc. Dilution train samples were collected bySouthern Research Institute. Method 5-type train samples were analyzed by Technology Applications, Inc.'s (TAI) staff under contract to EPA's Environmental Monitoring Systems Laboratory (EMSL) in Cincinnati, Ohio. Dilution train samples, Method 5-type samples, and impinger train samples were analyzed by Entropy Environmentalists, Inc. TAI used an ion chromatograph with post column reaction (IC/PCR) and inductively coupled argon plasmography/mass spectrometry (ICP/MS) to analyze the Method 5-type samples. A stable chromium isotope (63CR(+6)) spiked onto the Method 5 filter prior to sample collection was used to assess conversion of Cr(+6). The samples analyzed by Entropy were collected using a dilution train on an 8.5 in X 11 in glass fiber filter, a Method 5-type sampling train on an 82 mm quartz fiber filter, and an impinger sampling train with an alkaline impinger reagent, and spiked with native hexavalent chromium and a radioactively-labeled chromium isotope (51Cr(+6)). The samples were analyzed for hexavalent chromium by IC/PCR and for the radioactive isotopes by scintillation (gamma) counting. EMSL has not released the TAI data. The preliminary method evaluation testing demonstrated that all sampling methods had problems with conversion of hexavalent chromium.

Keywords: *Sewage sludge, *Sludge disposal, *Incineration, *Air pollution sampling, *Air pollution detection, *Chromium, Chemical analysis, Combustion products, Air sampling, Site surveys, Ion chromatography, Mass spectroscopy, Isotopic labeling, Tracer studies, Molecular energy levels, Chromium isotopes, Inductively coupled argon plasmography, EPA method 5.

PB92-151570/REB PC **A07/MF A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Emissions of Metals, Chromium and Nickel Species, and Organics from Municipal Wastewater Sludge Incinerators. Volume 3. Site 6 Emissions Test Report. Final rept. 1989-91.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
R. R. Segall, and W. G. DeWees. Mar 92, 144p EPA/600/R-92/003C
Contract EPA-68-CO-0027
See also Volume 2, PB92-151562 and Volume 4, PB92-151588. Prepared in cooperation with DEECO, Inc., Cary, NC., and Lewis (F. Michael), Mountain View, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Also available in set of 9 reports PC E99/MF E99, PB92-151547.

Site 6, a multiple hearth furnace was tested under two operating conditions, normal combustion was compared with improved combustion conditions as indicated by reduced CO and THC emissions. The effect of lime conditioning on the conversion of total chromium in the sludge to hexavalent chromium emissions was also a primary concern at Site 6. Secondary objectives included comparing the results for chromium and nickel subspecies determined by different analytical procedures, gathering data on other metals and inorganic/organic gases in incinerator emissions, and assessing pollutant removal efficiencies by measuring emissions at both the inlet and outlet to the control system. The Site 6 plant treats 30 million gallons a day of municipal and industrial wastewater. The blended primary/secondary sludge is dewatered to approximately 28% solids using recessed plate cloth filters. The metal mass emissions rate for the outlet runs averaged: As - not detected (< 508 mg/hr), Be - not detected (< 2.2 mg/hr), Cd - 1,450 mg/hr, Cr - 83.3 mg/hr, Pb - 21,100 mg/hr, and Ni - 73.9 mg/hr. The particulate mass emission rates averaged 42 kg/hr and 0.7 kg/hr, respectively for the inlet andoutlet. A positive correlation between the CO/CO2 ratios (an indication of combustion conditions) and the hexavalent to total chromium ratio was demonstrated for the outlet location. At low CO levels (good combustion) the ratio of hexavalent chromium to trivalent chromium was highest, with approximately 10% of the total chromium in the form of hexavalent chromium. It was anticipated that the nickel subsulfide emissions from multiple hearth incinerators would constitute less than 1% of the total nickel emissions. A wet chemical analysis indicated that within the detection limit (< 10%), no nickel subsulfide was present.

Keywords: *Sewage sludge, *Sludge disposal, *Incineration, *Air pollution sampling, *Air pollution detection, Concentration(Composition), Site surveys, Combustion efficiency, Air pollution control equipment, Chromium, Municipal wastes, Quality assurance, Incinerators, Carbon monoxide, Organic compounds, Chemical analysis, Dewatering, Chromium, Nickel, Particles, Metals, Industrial wastes.

PB92-151588/REB PC **A13/MF A03**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Emissions of Metals, Chromium and Nickel Species, and Organics from Municipal Wastewater Sludge Incinerators. Volume 4. Site 6 Emission Test Report - Appendices. Final rept. 1989-91.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
R. R. Segall, and W. G. DeWees. Mar 92, 291p EPA/600/R-92/003D
Contract EPA-68-CO-0027
See also Volume 3, PB92-151570 and Volume 5, PB92-151596. Prepared in cooperation with DEECO, Inc., Cary, NC., and Lewis (F. Michael), Mountain View, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Also available in set of 9 reports PC E99/MF E99, PB92-151547.

Site 6, a multiple hearth furnace was tested under two operating conditions, normal combustion was compared with improved combustion conditions as indicated by reduced CO and THC emissions. The effect of lime conditioning on the conversion of total chromium in the sludge to hexavalent chromium emissions was also a primary concern at Site 6. Secondary objectives included comparing the results for chromium and nickel subspecies determined by different analytical procedures, gathering data on other metals and inorganic/organic gases in incinerator emissions, and assessing pollutant removal efficiencies by measuring emissions at both the inlet and outlet to the control system. Volume IV contains the appendices to volume III (Site 6 Emission Test Report). These are (1) Incinerator and Scrubber Operating Data; (2) Sampling and Analytical Methods; (3) Sample Calculations; (4) Analytical Data and Reports, and (5) Continuous Emissions Monitoring Data, Calibrations/One-min Average.

Keywords: *Sewage sludge, *Sludge disposal, *Incineration, *Air pollution sampling, *Air pollution detection, Concentration(Composition), Continuous sampling, Chemical analysis, Calibrating, Tables(Data), Metals, Air pollution control equipment, Scrubbers, Sample preparation, Combustion products, Chromium, Nickel, Carbon monoxide, Municipal wastes, Industrial wastes, Operations, Site surveys.

PB92-151596/REB PC **A03/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Emissions of Metals, Chromium and Nickel Species, and Organics from Municipal Wastewater Sludge Incinerators. Volume 5. Site 7 Test Report CEMS Evaluation. Final rept. 1989-91.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
A. L. Cone, and S. A. Shanklin. Mar 92, 50p EPA/600/R-92/003E

Contract EPA-68-CO-0027
See also Volume 4, PB92-151588 and Volume 6, PB92-151604. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Also available in set of 9 reports PC E99/MF E99, PB92-151547.

The U.S. Environmental Protection Agency (EPA) Office of Water Regulations and Standards (OWRS) has recently revised the risk-based sludge regulations under Section 405d of the Clean Water Act. The revised regulations include a provision for monitoring total hydrocarbon (THC) and/or carbon monoxide (CO) emissions as a surrogate for organic emissions measurements. With the assistance of EPA's Risk Reduction Engineering Laboratory (RREL), OWRS has implemented a research program to investigate the relationship of CO and hydrocarbon emissions and the viability of the monitoring systems used to continuously measure these emissions. The test report presents the results obtained at the Site 7 municipal wastewater treatment facility. The CO and THC emission levels showed good agreement during the test program, i.e., increases in CO are accompanied by increases in THC. The actual correlation coefficients ranged from .73-.93 using one-minute averaged data from six test runs. Comparisons of CO and THC values corrected to 7% oxygen levels do not provide the same measure of correlation (r-values from .11 to .83). Possible explanation of the apparent change in agreement is being investigated further. The report presents uncorrected and corrected emission data in both tabular and graphic formats.

Keywords: *Sewage sludge, *Sludge disposal, *Incineration, *Air pollution sampling, Pollution regulations, Continuous sampling, Metals, Particles, Combustion products, Air sampling, Site surveys, Concentration(Composition), Hydrocarbons, Carbon monoxide, Tables(Data), Graphs(Charts), Quality assurance, Quality control, Air pollution standards, Clean Water Act, Continuous emission monitoring.

PB92-151604/REB PC **A07**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Emissions of Metals, Chromium and Nickel Species, and Organics from Municipal Wastewater Sludge Incinerators. Volume 6. Site 8 Emission Test Report. Final rept. 1989-91.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
R. R. Segall, and W. G. DeWees. Mar 92, 139p EPA/600/R-92/003F
Contract EPA-68-CO-0027
See also Volume 5, PB92-151596 and Volume 7, PB92-151612. Prepared in cooperation with DEECO, Inc., Cary, NC., and Lewis (F. Michael), Mountain View, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Also available in set of 9 reports PC E99/MF E99, PB92-151547.

The Site 8 facility is a 24.1 million gallons per day (MGD) secondary biological treatment plant with a 0.1 MGD septage handling facility. The wastewater influent comes from predominantly (90 percent) domestic sour ces. The treatment facility serves a population of approximately 175,000. All 22 tons per day of sludge solids are dewatered by two belt presses to a concentration of 22 to 25 percent solids. Approximately 15 to 17 tons of solids are dewatered by one press and fed to the fluidized bed incinerator. The air pollution control system associated with the incinerator consists of a water injection venturi, and an impingement tray scrubber. A pilot-scale wet eletrostatic precipitator had been installed and was tested. The ratio of hexavalent chromium to total chromium in the emissions was very low (despite relatively high total chromium levels), probably due to the short sludge retention time in the fluidized bed incinerator and the absence of alkaline material in the sludege. The ratio of nickel subsulfide to total nickel in the emissions was extremely low, with the nickel sulfide/subsulfide species measured at the inlet and midpoint being less than the detection limit. Compared to Site 3, a fluidized bed incinerator where the only semi-volatile organic compound detected was bis(2-ethylhexyl)phthalate, several additional semivolatiles were found in the emissions at Site 8. These were 1,2-dichlorobenzene, 1,4-dichlorobenzene, benzyl alcohol, benzoic acid, and naphthalene. The volatile organic compound emission results for Site 8 were consistent with the results for Site 3 (an other fluidized-bed incinerator). Carbon tetrachloride and chlorobenzene, reported in the emissions at Site 3, were not found in the emissions from Site 8.

Keywords: *Sewage sludge, *Sludge disposal, *Incineration, *Air pollution sampling, *Air pollution detection, Metals, Chromium, Organic compounds, Dewatering, Nickel, Combustion products, Site surveys, Chemical analysis, Polychlorinated dibenzofurans, Air pollution control equipment, Scrubbers, Fluidized bed processing, Electrostatic precipitators, Particles, Polychlorinated dibenzodioxins, EPA method 1, EPA mehtod 2, EPA method 3, EPA method 4.

PB92-151612/REB PC **A16**/MF **A03**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Emissions of Metals, Chromium and Nickel Species, and Organics from Municipal Wastewater Sludge Incinerators. Volume 7. Site 8 Emission Test Report - Appendices. Final rept. 1989-91.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
R. R. Segall, and W. G. DeWees. Mar 92, 351p EPA/600/R-92/003G
Contract EPA-68-CO-0027
See also Volume 6, PB92-151604 and Volume 8, PB92-151620. Prepared in cooperation with DEECO, Inc., Cary, NC., and Lewis (F. Michael), Mountain View, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Also available in set of 9 reports PC E99/MF E99, PB92-151547.

The Site 8 facility is a 24.1 million gallons per day (MGD) secondary biological treatment plant with a 0.1 MGD septage handling facility. The wastewater influent comes from predominantly (90 percent) domestic sources. The treatment facility serves a population of approximately 175,000. All 22 tons per day of sludge solids are dewatered by two belt presses to a concentration of 22 to 25 percent solids. Approximately 15 to 17 tons of solids are dewatered by one press and fed to the fluidized bed incinerator. The air pollution control system associated with this incinerator consists of a water injection venturi, and an impingement tray scrubber. A pilot-scale wet eletrostatic precipitator had been installed and was tested. Volume 7 contains the appendices for volume 6. These are (1) Incinerator and Scrubber Operating Data; (2) Sampling and Analytical Methods; (3) Sample Calculations; (4) Analytical Data and Reports, and (5) Continuous Emission Monitoring Data Calibrations/One-min averages.

Keywords: *Sewage sludge, *Sludge disposal, *Incineration, *Air pollution sampling, *Air pollution detection, Chemical analysis, Site surveys, Air pollution control equipment, Scrubbers, Electrostatic precipitators, Polychlorinated dibenzofurans, Concentration(Composition), Nickel, Chromium, Continuous sampling, Fluidized bed processing, Organic compounds, Particles, Tables(Data), Polychlorinated dibenzodioxins, Continuous emission monitoring.

PB92-151620/REB PC **A08**/MF **A02**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Emissions of Metals, Chromium and Nickel Species, and Organics from Municipal Wastewater Sludge Incinerators. Volume 8. Site 9 Emission Test Report. Final rept. 1989-91.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
W. G. DeWees, R. R. Segall, and F. M. Lewis. Mar 92, 159p EPA/600/R-92/003H
Contracts EPA-68-CO-0027, EPA-68-02-4442
See also Volume 7, PB92-151612 and Volume 9, PB92-151638. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Also available in set of 9 reports PC E99/MF E99, PB92-151547.

Site 9 is a secondary plant designed for 15 million gallons per day (MGD) of wastewater flow. The sludge incinerator at Site 9 is a seven (7) hearth, multiple hearth furnace (MHF) built by Nichols Engineering in 1974 controlled by an adjustable throat venturi, with a nominal pressure drop of 20 in. w.c.. After leaving the venturi, the gases pass upward through a three (3) plate tray scrubber with a Chevron mist eliminator. A 10 ft. x 10 ft., upflow, wet electrostatic precipitator, manufacturer by Beltran Associates, Inc., was installed during the first week of testing. The ratio of nickel subsulfide to total nickel in the emission at Site 9 is extremely low, with the sulfidic nickel species being measured at less than detection limit (about 1 to 2 percent of the total nickel). The ratio of hexavalent chromium to total chromium in the emissions at Site 9 was significantly higher that had been anticipated. Site 9 had only two semivolatile organic compounds detected under normal and improved combustion conditions benzyl alcohol and benzoic acid. Several additional compounds were found in the emissions for the normal or improved combustion conditions at Site 9; these compounds were 1,4-dichlorobenzene, 1,2-dichlorobenzene, 2-nitrophenol, 1,2,4-Trichlorobenzene, naphthalene, 2-methylnaphthalene, dibenzofuran, phenanthrene, bis(2-ethylhexyl)phthalate, phenol, 4-methylphenol, and 4-nitrophenol. The volatile organic compounds detected in the Site 9 multiple hearth incinerator emissions were similar to the compounds reported for Sites 1, 2, and 4 (other multiple hearth incinerator tested). Carbon tetrachloride and carbon tetrachloride, reported in the emissions at the other three sites, were not found in the emissions from Site 9.

Keywords: *Sewage sludge, *Sludge disposal, *Incineration, *Air pollution sampling, *Air pollution detection, Site surveys, Chemical analysis, Scrubbers, Air pollution control equipment, Electrostatic precipitators, Nickel, Chromium, Metals, Organic compounds, Volatile organic compounds, Polychlorinated dibenzodioxins, Polychlorinated dibenzofurans, Continuous sampling, Quality assurance, EPA method 1, EPA method 2, EPA method 3, EPA method 4.

PB92-151638/REB PC **A99**/MF **A06**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Emissions of Metals, Chromium and Nickel Species, and Organics from Municipal Wastewater Sludge Incinerators. Volume 9. Site 9 Emission Test Report - Appendices. Final rept. 1989-91.
Entropy Environmentalists, Inc., Research Triangle Park, NC.
R. R. Segall, W. G. DeWees, and F. M. Lewis. Mar 92, 613p EPA/600/R-92/003I
Contracts EPA-68-CO-0027, EPA-68-02-4462
See also Volume 8, PB92-151620. Prepared in cooperation with DEECO, Inc., Cary, NC., and Lewis (F. Michael), Mountain View, CA. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Also available in set of 9 reports PC E99/MF E99, PB92-151547.

Site 9 is a secondary plant designed for 15 million gallons per day (MGD) of wastewater flow. The sludge incinerator at Site 9 is a seven (7) hearth, multiple hearth furnace (MHF) built by Nichols Engineering in 1974 controlled by an adjustable throat venturi scrubber with a nominal pressure drop of 20 in. w.c.. After leaving the venturi, the gases pass upward through a three (3) plate tray scrubber with a Chevron mist eliminator. A 10 ft. x 10 ft., upflow, wet electrostatic precipitator, manufacturer testing. Volume 9 contains the appendices PB92-151620 for Volume 8. These include: (1) Incinerator and Scrubber Operating Data, (2) Sampling and Analytical Methods; (3) Sample Calculations; (4) Analytical Data and Reports; (5) Continuous Emission Monitoring Data, Calibrations/One-min Averages, and (6) External Audit Report.

Keywords: *Sewage sludge, *Sludge disposal, *Incineration, *Air pollution sampling, *Air pollution detection, Chemical analysis, Site surveys, Metals, Chromium, Nickel, Organic compounds, Concentration(Composition), Laboratory equipment, Tables(Data), Field tests, Air sampling, Auditing, Quality assurance, Standards, Calibrating.

PB92-151653/REB PC **A04**/MF **A01**
Corvallis Environmental Research Lab., OR.
Alaska North Slope Oil-Field Restoration Research Strategy. Manual.
ManTech Environmental Technology, Inc., Corvallis, OR.
J. G. Wyant, and C. M. Knapp. Mar 92, 59p EPA/600/R-92/022
See also DE91006616 and AD-A184 442. Prepared in cooperation with Technical Resources, Inc., Davis, CA. Sponsored by Corvallis Environmental Research Lab., OR.

The document provides a research strategy to support ecological restoration of disturbances related to oil and gas developments on the North Slope of Alaska

that is mutually beneficial to the arctic ecorestoration research community and the arctic regulatory community (including at least the following entities: The U.S. Army Corps of Engineers, EPA, National Marine Fisheries, US FWS, BLM, the Alaska Department of Natural Resources, and the North Slope Borough). The purpose of this strategy is to: (1) identify major information or knowledge gaps that have inhibited restoration activities or slowed the regulatory decision process, (2) determine the potential for filling knowledge gaps through research, and (3) suggest tentative priorities for research that are based on the needs identified in steps one and two.

Keywords: *Ecology, *Offshore drilling, *Crude oil, *Arctic regions, *Pollution abatement, Disturbances, Oil pollution, Recovery, Water pollution, Tundra, Cost effectiveness, Regulations, Benefit cost analysis, Permafrost, Government policies, US EPA, Erosion control, Mines(Excavations), *Alaskan North Slope, Revegetation, Habitats, Wetlands, Oil spills.

PB92-152834/REB PC A05/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Emission Factor Documentation for AP-42 Section 2.5, Sewage Sludge Incineration.
Midwest Research Inst., Cary, NC.
Aug 90, 93p EPA/450/4-90/017
Contract EPA-68-02-3891
See also PB92-152867, PB83-127496, PB87-199626, PB88-186101 and PB88-186754. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The report documents information used in the development of AP-42 Section 2.5, 'Sewage Sludge Incineration.' The document 'Compilation of Air Pollutant Emission Factors,' more commonly known as AP-42, has been published by the U. S. Environmental Protection Agency since 1972 to provide emission factors for sources of criteria pollutant emissions. Documentation of AP-42 Section 2.5 describes the sewage sludge incineration process, discusses emissions data collected for this industry, details the development of pollutant emission factors for sewage sludge incineration, and presents the AP-42 Section.

Keywords: *Emission factors, *Sewage sludge, *Sludge disposal, *Air pollution sampling, *Incineration, Compliance, Waste disposal, Concentration(Composition), Combustion products, Air pollution control, Particle size, Tables(Data), Incinerators.

PB92-152842/REB PC A03/MF A01
Creosote, Pentachlorophenol, and Inorganic Arsenicals; Amendment of Notice of Intent to Cancel Registrations.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
cJan 86, 17p EPA/540/09-92/179
See also PB84-241539.

The Position Document addresses the risks and benefits of pesticide products containing creosote, pentachlorophenol, and inorganic arsenicals. The Agency has determined that the use of products containing the subject active ingredient may meet or exceed a risk criterion described in 40 CFR Part 154. Potential hazards are examined further to determine the nature and extent of the risk, and considering the benefits of the subject active ingredient, whether such risks cause unreasonable adverse effects on the environment.

Keywords: *Wood preservatives, *Creosote, *Pentachlorophenol, *Arsenicals, *Cancellation, Standards, Protective clothing, Labels, Ecology, Manufacturing, Regulations, Reprints, *Pesticide registration.

PB92-152859/REB PC A05/MF A02
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
National Air Pollutant Emission Estimates 1940-1990.
Pechan (E.H.) and Associates, Inc., Durham, NC.
Nov 91, 99p* EPA/450/4-91/026
See also PB91-168559. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The report presents U.S. EPA's latest estimates of national and regional emissions for criteria air pollutants: total particulate matter, including fine particulate matter (PM-10); sulfur oxides (SOx); nitrogen oxides (NOx); volatile organic compounds (VOC); carbon monoxide (CO); and lead. The report contains new information on the regional trends of all criteria pollutant emissions including, for the first time, fugitive dust PM-10 emissions. The report also presents emissions for the nation to the years 2000 and 2010 and comparison of ozone season and annual daily average emission of VOC and NOx.

Keywords: *Air pollution, *Particulates, *United States, Exhaust emissions, Sources, Estimates, Regions, Carbon monoxide, Sulfur oxides, Nitrogen oxides, Concentration(Composition), Industrial wastes, Emission factors, Lead(Metal), Trends, Forecasting, Volatile organic compounds.

PB92-152867/REB PC A15/MF A03
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Emission Factor Documentation for AP-42 Section 2.1.1., Municipal Waste Combustion.
Midwest Research Inst., Cary, NC.
Aug 90, 336p EPA/450/4-90/016
Contract EPA-68-02-3891
See also PB92-152834 and PB92-126945. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The report documents information used in the development of AP-42 Section 2.1.1, 'Municipal Waste Combustion.' The document 'Compilation of Air Pollutant Emission Factors,' more commonly known as AP-42, has been published by the U.S. Environmental Protection Agency since 1972 to provide emission factors for sources of criteria pollutant emissions. Documentation of AP-42 Section 2.1.1 describes the municipal waste combustion process, discusses emissions data collected for the industry, details the development of pollutant emission factors for municipal waste combustion, and presents the AP-42 Section.

Keywords: *Emission factors, *Air pollution sampling, *Municipal wastes, *Waste disposal, *Incineration, Compliance, Combustion products, Pollution sources, Particle size, Incinerators, Tables(Data), Concentration(Composition), Performance evaluation.

PB92-152875/REB PC A06/MF A02
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Development of an Empirical Model of Methane Emissions from Landfills. Final rept. Mar-Dec 91.
Radian Corp., Research Triangle Park, NC.
R. L. Peer, D. L. Epperson, D. L. Campbell, and P. von Brook. Mar 92, 105p EPA/600/R-92/037
Contract EPA-68-D9-0054
See also PB90-215112, PB91-136960, PB91-149534 and PB92-101351. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report gives results of a field study of 21 U.S. landfills with gas recovery systems, to gather information that can be used to develop an empirical model of methane (CH4) emissions. Site-specific information includes average CH4 recovery rate, landfill size, tons of refuse (refuse mass), average age of the refuse, and climate. A correlation analysis showed that refuse mass was positively linearly correlated with landfill depth, volume, area, and well depth. Regression of the CH4 recovery rate on depth, refuse mass, and volume was significant, but depth was the best predictive variable (R2 = 0.53). Refuse mass was nearly as good (R2 = 0.50). None of the climate variables (precipitation, average temperature, dewpoint) were correlated with the CH4 recovery rate or with CH4 recovery per metric ton of refuse. Much of the variability in CH4 recovery remains unexplained, and is likely due to between-site differences in landfill construction, operation, and refuse composition. A model for global landfill emissions estimation is proposed.

Keywords: *Methane, *Gas production, *Gas recovery, *Mathematical models, *Waste disposal, *Air pollution sampling, *Earth fills, Air pollution control, Concentration(Composition), Climate, Statistical analysis, Emission factors, Global aspects.

PB92-152933/REB PC A03/MF A01
Developments in Chemical Treatment of Contaminated Soil. Symposium paper.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
B. Davila, and M. H. Roulier. 1992, 22p EPA/600/A-92/030
Presented at Panamerican Chemical Congress (2nd), San Juan, Puerto Rica, September 24-29, 1991. See also PB90-155607.

The U.S. Environmental Protection Agency's Office of Research and Development (ORD) is examining processes for remedial action at Superfund sites, and corrective action at operating disposal sites. Recent legislation emphasizes destruction and detoxification of contaminants, rather than containment or storage of contaminated soils. Chemical treatment appears promising because it can destroy or greatly change many contaminants. Oxidation, reduction, neutralization, hydrolysis, dehalogenation, and UV/photolysis are chemical processes currently used for above-ground treatment. Temperature and physical and chemical characteristics of soil are some operating parameters that control the effectiveness of these processes. Excalibur catalytic ozone technology, Exxon and Rio Linda cyanide destruction, and Trinity ultrasonic detoxification are innovative technologies that have been, or are currently being considered for pilot-scale demonstrations.

Keywords: *Soil treatment, *Waste treatment, *Remedial action, *Superfund, Land pollution control, Hazardous materials, Ground disposal, Standards compliance, Dehalogenation, pH value, Photochemical reactions, Oxidation, Reduction(Chemistry), Hydrolysis, Neutralizing, Ultraviolet radiation, Photolysis, Ozonization, *Chemical treatment.

PB92-152941/REB PC A02/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
PAST: The Potential ARARs Selection Tool.
Computer Sciences Corp., Cincinnati, OH.
D. Greathouse, and J. Clements. 1992, 7p EPA/600/A-92/031
Contract EPA-68-W0-0043
Pub. in HMCRI's Annual National Conference Proceedings (12th), Hazardous Materials Control/Superfund '92, December 3-5, 1991, Washington, DC., p632-636. See also PB90-272535 and PB90-148461. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The 1986 Superfund Amendments and Reauthorization Act (SARA) specified that any remedial actions at Superfund sites must comply with applicable or relevant and appropriate regulations (ARARS), including Federal, state, and local environmental statutes. Identifying these legal requirements for a particular hazardous waste site can be a complex and time consuming process. The EPA Risk Reduction Engineering Research Laboratory is developing a prototype knowledge-based system to aid in screening regulations that determine clean-up requirements based on unique site characteristics. The decision logic follows that presented in the EPA documents such as CERCLA Compliance with Other Laws Manuals (Part I and II). Hence, it takes into consideration the chemicals at the site, the particular location features of the site, and the proposed remediations methods.

Keywords: *Superfund, *Hazardous materials, *Pollution regulations, *Waste management, *Remedial action, *Expert systems, Land pollution abatement, Compliance, Site characterization, Chemical compounds, Legal aspects, Reprints, *Applicable or Relevant and Appropriate Regulations, *PAST system, Cleanup operations.

PB92-152958/REB PC A06/MF A02
Environmental Protection Agency, Research Triangle Park, NC.
Diagnostic Evaluation of Regional Acid Deposition Model (RADM) Performance during a Period of Frontal Passage Using Aircraft Measurements.
Conference paper Aug 88-Sep 90.
Battelle, Columbus, OH.
C. W. Spicer, J. Ching, R. Dennis, E. Schaller, and C. Lindsey. 1992, 108p EPA/600/A-92/032
Contract EPA-68-02-4548

Prepared in cooperation with Battelle, Columbus, OH. Sponsored by Environmental Protection Agency, Research Triangle Park, NC.

Acid deposition is the end product of a complex, large-scale, tightly coupled system of atmospheric transport processes and chemical reactions. To achieve a credible understanding of acid deposition processes upon which to base policy decisions, the United States began the National Acid Precipitation Assessment Program (NAPAP) in the early 1980s. Throughout the life of NAPAP two key scientific questions have been raised concerning emission of pollutants and acidic deposition: What are the geographic origins of observed levels of deposition; and What will be the effectiveness of emissions reductions for reducing observed levels of acidic deposition. The best hope of answering these questions realistically is to simulate the complex atmospheric system using credible numerical models. As part of the Acid MODES program, instrumented aircraft were used during the summer of 1988 to gather data aloft for diagnostic evaluation of regional Eulerian acid deposition models.

Keywords: *Acidification, *Deposition, *Mathematical models, *Regional analysis, *Air pollution control, Environmental transport, Atmospheric chemistry, Aerial surveys, Environmental policy, Atmospheric diffusion, Fronts(Meteorology), Performance evaluation, *Regional Acid Deposition Model, National Acid Precipitation Assessment Program, Eulerian models.

PB92-152966/REB PC **A02/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Partitioning of the Sulfate Budget into Gas and Aqueous-Phase Components in the Regional Acid Deposition Model (RADM). Conference rept. Jan 89-Sep 90.
National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div.
J. N. McHenry, and R. L. Dennis. Jan 91, 7p EPA/600/A-92/033
Contract EPA-68-01 7365
Pub. in Joint Conference on Applications of Air Pollution with Air Waste Management Association, New Orleans, LA., January 14-18, 1991. See also PB90-252628 and PB91-119669. Prepared in cooperation with Computer Sciences Corp., Research Triangle Park, NC. Applied Technology Div. Sponsored by Environmental Protection Agency, Research Triangle Park, NC.

A diagnostic version of the RADM Engineering Model, called the Sulfate Tracking Model (STM), has been developed. Like other members of the RADM Engineering Model family (Chang et al., 1990; Binkowski, et al., 1990), the STM is a sulfur and hydrogen peroxide engineering version that makes use of chemical and oxidant (other than H2O2) fields precalculated in full RADM runs to predict atmospheric SO2, SO4(2-), and H2O2 transport, transformation, and deposition. The sulfur/H2O2 engineering models accurately reproduce RADM sulfur predictions through mathematical manipulation of the sulfur chemical dynamics, for a wide range of sulfur emissions scenarios. Hydrogen peroxide fields are calculated by making the RADM-generated OH and HO2 fields available to the STM's peroxide chemical solver, which replicates the RADM's peroxide chemical solver. Therefore, the STM dynamically tracks the influence of SO2 levels on H2O2 loss. Unique to this model is its capability of separating the complete SO4(2-) fields into constituents according to the chemical processes which created them. This permits a wide variety of diagnostic studies to be performed at low cost, aiding greatly in the authors understanding of how the RADM predicts the creation, transport, and deposition of sulfate.

Keywords: *Acidification, *Air pollution, *Deposition, *Mathematical models, *Sulfates, Sulfur, Hydrogen peroxide, Oxidizers, Environmental transport, Atmospheric chemistry, Clouds(Meteorology), Chemical reactions, Reprints, *Sulfate Tracking Model, Regional Acid Deposition Model.

PB92-152974/REB PC **A02/MF A01**
Investigation of RADM Performance Using Aircraft Measurements. Conference paper.
National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div.
J. Ching, J. Chang, C. Spicer, and E. Schaller. Jan 91, 6p EPA/600/A-92/034
Pub. in Joint Conference on Applications of Air Pollution with Air and Waste Management Association (7th), New Orleans, LA., January 14-18, 1991. Prepared in cooperation with State Univ. of New York at Albany. Atmospheric Sciences Research Center, Battelle Columbus Div., OH. Environmental Sciences Dept.

Measurements using specially instrumented aircraft were obtained during August and September, 1988 as an integral part of the ACID MODES (Model Operational and Diagnostic Evaluation Study) field study. Specialized flights, each designed to diagnose different aspects of the performance of the Regional Acid Deposition Model (RADM), were performed. Briefly, zig-zag type horizontal transects (ZIPPER) and vertical up-and-down saw tooth transects (CURTAIN) during fair weather conditions provide an evaluation of the of the skill by which RADM predicts the overall magnitude, as well as the horizontal and vertical gradient and spatial pattern of all the major acidic species and precursers on a regional scale. The data provide a reference for testing the model's ability to distribute primary pollutants from the source regions and to predict the correct magnitude of the gas phase conversion rates exemplified by the secondary species. The Frontal Passage flights were performed to test the RADM's ability to simulate conditions associated with a synoptic front representing a major scavenging event. This is reported in Spicer et al., (1991). Horizontal transects in and above the mixed layer over 1000 km distances were flown parallel to a cold front prior to, soon after, and then during pollutant build up. This series of flights took nearly one week to accomplish. Finally, a set of flights designed to characterize the diurnal behavior of the primary and secondary species over approximately four RADM cells provides the means to evaluate the performance of the gas phase chemistry and the daytime mixing aspects of the RADM. A case study is discussed in Schaller et al., (1991). Individually, each type of flight pattern is designed to emphasize model performance for conditions in which different sets of processes are in control. Collectively, the tests provide a powerful measure of the RADM's overall skill and scientific credibility.

Keywords: *Air pollution sampling, *Aerial surveys, *Acidification, *Deposition, *Mathematical models, Performance evaluation, Dry methods, Wet methods, Comparison, Concentration(Composition), Regional analysis, Spatial distribution, *Regional Acid Deposition Model.

PB92-152982/REB PC **A02/MF A01**
Sensitivity of RADM to Point Source Emissions Processing. Conference paper Mar 88-Sep 90.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
D. W. Byun, and F. S. Binkowski. 1992, 6p EPA/600/A-92/035
See also DE84005177 and PB86-181310. Prepared in cooperation with Computer Sciences Corp., Research Triangle Park, NC., and National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div.

The Regional Acid Deposition Model (RADM) and associated Engineering Model have been developed to study episodic source-receptor relationships on a regional scale. The RADM includes transport, chemical transformation, and deposition processes as well as input of emissions into the vertical layers using a plume-rise submodel. As wind speed and direction change with height, and as atmospheric turbulence varies significantly with distance from the earth's surface, the model predictions can be affected considerably by the height at which the emissions are injected. Atmospheric emissions can be divided into area and point sources. The area sources include mobile emissions, biogenic emissions, and other emissions that are often related to the surface area of the earth. Area sources are more difficult to control and have inherent diversities in their physiochemical processes. Point sources include stacks at power plants and manufacturing facilities. Usually, point sources are the target of emission reduction programs.

Keywords: *Air pollution, *Acidification, *Deposition, *Mathematical models, Regional analysis, Pollution sources, Point sources, Environmental transport, Atmospheric chemistry, Natural emissions, Atmospheric diffusion, *Regional Acid Deposition Model, *Source-receptor relationships, Area sources.

PB92-152990/REB PC **A03/MF A01**
Summary, Projections, and Recommendations. (Chapter 13). Book chapter.
Corvallis Environmental Research Lab., OR.
R. K. Olson, D. L. Peterson, and M. Boehm. 1992, 24p EPA/600/A-72/036
Pub. in The Response of Western Forests to Air Pollution, Springer-Verlag, 1992. See also PB86-244639. Prepared in cooperation with Washington Univ., Seattle.

The first seven chapters of the book deal with the entire West. Chapters 8-12 then focus on forest condition in particular regions within the West. The goal of the chapter is to return to a West-wide perspective and in so doing (1) summarize the current condition of Western forests as effected by air pollution, (2) discuss future trends in forest condition, and (3) recommend research priorities for advancing the authors understanding of air pollution effects on Western forests.

Keywords: *Air pollution effects(Plants), *Forests, Environmental effects, Trees(Plants), Trends, Research and developments, Forecasting, Exposure, Western Region(United States).

PB92-153006/REB PC **A03/MF A01**
Global Assessment of Promising Forest Management Practices for Sequestration of Carbon. Symposium paper.
Corvallis Environmental Research Lab., OR.
J. K. Winjum, R. K. Dixon, and P. E. Schroeder. 17 Jan 92, 20p EPA/600/A-92/037
Pub. in Proceedings of US/Canada Symposium on Implications of Climate Change for Pacific NW Forest Management, Seattle, WA., Oct 91. See also PB92-122787.

The assessment produced productivity and cost data for forest and agroforestry management practices in 94 nations. That is, out of a total of 140 nations in the world with forest resources, about two-thirds are represented in the database at present. The total forest and woodland area of the 94 nations is about 3.8 billion ha or approximately 93% of the world's total. In terms of mean carbon storage (MCS in t/ha) by categories of promising forest practices across latitudinal zones, several trends are seen. As expected, due to warmer and longer growing seasons towards the tropics, carbon sequestration in living biomass generally increases from the boreal, to the temperate, to the tropical latitudes. Silviculture has the lowest median values in tC/ha for all three latitudinal zones: boreal, 10; temperate, 26; and tropical, 34. While enhancing productivity in existing forest stands and plantations, silviculture does not directly contribute to increasing forest land area, an important attribute for significant contributions toward increasing global forest carbon sequestration.

Keywords: *Forest management, *Carbon cycle, *Air pollution control, Information systems, Organic matter, Air-biosphere interactions, Terrestrial ecosystems, Natural emissions, Global aspects, Reforestation, Afforestation, Silviculture, Agronomy, Land use, *Carbon sequestration.

PB92-153014/REB PC **A02/MF A01**
Design Issues for Evaluating Seedling Exposure Studies. Symposium paper.
Corvallis Environmental Research Lab., OR.
C. E. Peterson, and R. A. Mickler. 1992, 10p EPA/600/A-92/038
Pub. in IUFRO Conference on Optimal Design of Forest Experiments and Surveys, September 10-13, 1991, London, UK. See also PB90-148875. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR.

Tree seedling studies, covering a wide range of experimental conditions in pollutant treatment, species, facilities, and exposure regimes, have become commonplace in forestry research for assessing the actual and potential environmental effects of air pollutants on forest ecosystems. While assuring a wide breadth of scientific information, sufficient consideration has not been given to either the comparability of such population studies or to their appropriate inference. The populations of seedlings for which seedling experiments

have inference, including the limitations in national or regional generalizations, should be made explicit in the results. Furthermore, the extent to which seedling results are applicable to mature trees and forests condition should not be left in doubt. Finally, the statistical power of any given analysis is almost never discussed, particularly when the outcomes are inconclusive. The approach for control of the exposure regime (i.e., achieving treatment target levels) is often assumed, rather than assured through documentation.

Keywords: *Air pollution effects(Plants), *Forestry, Statistical models, Exposure, Species diversity, Air quality, Reprints, Seedlings, Data quality, Study design.

PB92-153022/REB PC A03/MF A01
Corvallis Environmental Research Lab., OR.
Equilibrium-Analysis of Projected Climate Change Effects on the Global Soil Organic Matter Pool. Symposium paper.
ManTech Environmental Technology, Inc., Corvallis, OR.
D. P. Turner, and R. Leemans. 1992, 14p EPA/600/A-92/039
Contract EPA-68-C8-0006
Pub. in Proceedings of Carbon Cycling in Boreal Forest and Subarctic Ecosystems Workshop, OSU, Corvallis, OR., September 9-12, 1991. See also PB92-153006 and PB92-122787. Sponsored by Corvallis Environmental Research Lab., OR.

Increased rates of soil organic matter decomposition may represent a significant positive feedback to global warming. As a step towards assessing the potential magnitude of this response, an equilibrium analysis was performed in which representative carbon pools were associated with each vegetation type and the Holdridge vegetation/climate correlation system was used to compare distributions of the vegetation types under the current climate and doubled-CO2 climate scenarios from four general circulation models (GCMs). Two of the GCMs predicted a net loss of belowground carbon (55-101 Pg) because of large decreases in the areal extent of tundra and boreal ecosystems with high levels of belowground carbon storage. Vegetation redistribution projected under the other two GCMs would result in the accumulation of carbon (5-41 Pg) in the biosphere, however, this accumulation was driven primarily by an increase in the areal extent of tropical rain forests which is unlikely given constraints imposed by anthropogenic factors. Other considerations not treated by the equilibrium approach also support the likelihood of a transient pulse of carbon from the soil to the atmosphere.

Keywords: *Organic matter, *Biodeterioration, *Global warming, *Climatic changes, *Air pollution, *Soil microorganisms, Vegetation, General Circulation Models, Carbon cycle, Air-biosphere interactions, Air land interactions, Microbial degradation, Terrestrial ecosystems, Biomes.

PB92-153030/REB PC A02/MF A01
Corvallis Environmental Research Lab., OR.
Mineral Weathering Rates in Acid-Sensitive Catchments: Extrapolation of Laboratory Experiments to the Field. Symposium paper.
Wyoming Univ., Laramie.
J. I. Drever, and N. Swoboda-Colberg. 1992, 6p EPA/600/A-92/040
Pub. in Water-Rock Interaction WRI-6, August 3-12, 1989, England. Sponsored by Corvallis Environmental Research Lab., OR.

The major processes by which acid deposition is neutralized in soils are cation exchange (including aluminum dynamics), sulfate adsorption, and chemical weathering. The long-term response, however, is dominated by chemical weathering, and the authors ability to predict the effect of acid deposition on chemical weathering rates is severely limited. The dissolution rates of size- and density-fractionated minerals from a soil at the Bear Brook site in Maine are similar to those of crushed 'museum' specimens, suggesting that prolonged exposure in the soil does not per se cause a decrease in weathering rate. The surface-area normalized weathering rate in the field plots appears to be a factor of 18 slower than in the lab experiments. The discrepancy might be due to an unrealistic estimate of contact time between minerals and solution, or to the inhibitory effect of high A1 concentrations on feldspar dissolution rates.

Keywords: *Weathering, *Water pollution control, *Soil chemistry, *Minerals, *Watersheds, Acidification, Water chemistry, Long term effects, pH, Experimental design, Field tests, Deposition, Experimental design.

PB92-153048/REB PC A04/MF A01
Corvallis Environmental Research Lab., OR.
Sulfur Dynamics of Forest Ecosystems. Symposium paper.
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
M. J. Mitchell, M. B. David, and R. B. Harrison. May 89, 58p EPA/600/A-92/041
Pub. in SCOPE Workshop on Sulphur Cycling in Wetland and Terrestrial Ecosystems, May 1989, Trent University, Peterborough, Ontario, Canada. See also DE86000091. Prepared in cooperation with Illinois Univ. at Urbana-Champaign. Dept. of Forestry, and Washington Univ., Seattle. Coll. of Forest Resources. Sponsored by Corvallis Environmental Research Lab., OR.

There has been considerable advancement in the understanding of the S biogeochemistry of forested ecosystems. Many recent studies have focused on ascertaining the impacts of acidic deposition of forest vegetation, soils and surface waters. Sulfur dynamics effects the flux of both H(+) and SO4(2-) both of which interact with other elemental cycles especially N and basic cations. There is extensive information on the S constituents and fluxes for temperate forest ecosystems, but little for tropical areas. These latter areas may be particularly important contributors to trace S gases in the troposphere. On regional as well as global scales, forest ecosystems are being subjected to changes in atmospheric loadings of S as well as other anthropogenic effects including deforestation and climatic alterations. Predicting how these changes will be, affect both organic and inorganic S pools of forest ecosystems and how these alterations will influence gaseous and leaching losses should be the general focus of future research on S biogeochemistry.

Keywords: *Forests, *Terrestrial ecosystems, *Biogeochemistry, *Sulfur, *Air pollution effects(Plants), Acidification, Deposition, Sulfur cycling, Environmental transport, Soil surveys, Surface waters, Water pollution.

PB92-153055/REB PC A03/MF A01
Emissions and Fuel Economy of DOE Flex-Fuel Vehicles.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
F. Black, and T. Kleindienst. 1992, 16p EPA-600/A-92/042
See also PB84-104702, PB89-118475 and PB89-180822. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC.

The U.S. Department of Energy and the U.S. Environmental Protection Agency have established, through a Memorandum of Understanding, a coordinated framework for collaborative research examining the impact of alternative motor vehicle fuels on air quality and risk to public health and welfare. A cooperative effort to examine the emissions and fuel economy of DOE flex-fuel vehicles, capable of operating on a variety of liquid fuels, and the atmospheric chemistry of the emissions, will begin in January, 1992. During the first year, emissions will be characterized for 6 vehicles, 2 conventional fuel baseline vehicles and 4 flex-fuel vehicles, using up to 9 fuels. Additionally, a dual-chamber irradiation facility will be constructed to support future study of the atmospheric chemistry of the emissions. These studies will examine the formation of ozone and toxic compounds. A detailed description of the experimental procedures to be used is provided.

Keywords: *Test methods, *Exhaust emissions, *Automotive fuels, *Fuel consumption, Chromatography, Gas analysis, Test facilities, Air pollution, Mathematical models, Quality assurance, Combustion products, Motor vehicle engines, Automobiles, *Flex-fuel vehicles.

PB92-153311/REB PC A03/MF A01
Rutgers - The State Univ., Piscataway, NJ. Dept. of Chemical and Biochemical Engineering.
Trace Elements, Leaching and Health Risks from Municipal Waste Combustion Ash.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
C. Wiles, and D. S. Kosson. 12 Oct 89, 11p EPA/600/A-92/043
Presented at the Electric Power Research Inst. Meeting, Springfield, MA., October 12, 1989-February 1991, p7-4 through 7-11. See also PB92-121201. Sponsored by Rutgers - The State Univ., Piscataway, NJ. Dept. of Chemical and Biochemical Engineering.

Combustion of municipal solid waste results in significant reduction of mass and volume (approximately 80% and 90% respectively) with recovery of usable energy in the form of steam or electricity. However, inorganic species including toxic metals and salts are concentrated in the incinerator residuals. Bottom ash and fly ash have been the focus of considerable controversy because of the potential leaching of salts and trace species such as lead, cadmium and other metals. The paper will present current data describing ash properties, leaching and treatment alternatives. USEPA's current program of testing for evaluating treatment and reuse methods will also be described.

Keywords: *Waste management, *Municipal wastes, *Incineration, *Air pollution control, *Residues, Trace elements, Metals, Fly ash, Ashes, Energy recovery, Leaching, Waste treatment, Waste utilization, Chemical properties, Physical properties, Inorganic salts, Reprints, Waste minimization, Source reduction.

PB92-153329/REB PC A02/MF A01
Robert S. Kerr Environmental Research Lab., Ada, OK.
Bacterial Transport through Homogeneous Soil. Journal article.
Cornell Univ., Ithaca, NY. Dept. of Soil, Crop, and Atmospheric Sciences.
J. T. Gannon, U. Mingelgrin, M. Alexander, and R. J. Wagenet. c1991, 8p EPA/600/J-92/076
Grant EPA-R-814487
Pub. in Soil Biol. Biochem, v23 n12 p1155-1160 1991. See also PB91-164277. Sponsored by Robert S. Kerr Environmental Research Lab., Ada, OK.

The transport of microorganisms in soils is of major importance for bioremediation of subsurface polluted zones and for pollution of groundwater with pathogens. A procedure for evaluating the relative mobility and recovery of bacteria in the soil matrix was developed. In the method devised, movement of bacteria along the walls of the column of soil and channeling were prevented. Changes in population size during the test period were minimal because temperatures of 2-5 C were maintained and predators and parasites were eliminated by (60)Co irradiation. The 19 strains of bacteria tested had markedly different degrees of transport. From 0.01 to 15% of the added cells passed through a 5-cm long column of Kendaia loam with four pore volumes of water and from 4.3% to essentially all of the added bacteria were recovered. The marked differences in the mobilities of the various bacteria and the high recoveries of most of the isolates suggested that the procedure developed is a useful means for selecting bacteria according to their mobilities in soils, aquifer materials, and other porous media. (Copyright (c) 1991 Pergamon Press plc.)

Keywords: *Soil microbiology, *Aquatic microbiology, *Water pollution, Environmental transport, Subsurface environments, Ground water, Pseudomonas, Loams, Enterobacter, Bacillus, Flavobacterium, Remedial action, Reprints.

PB92-153337/REB PC A03/MF A01
Pollution Prevention Methods in the Surface Coating Industry. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
P. M. Randall. c1992, 23p EPA/600/J-92/077
Pub. in Jnl. of Hazardous Materials, v29 n2 p275-295, Jan 92. See also PB90-256405 and PB90-263989.

The surface coating industry is rapidly changing to meet environmental and economic pressures. Some of the changes include new formulations which meet environmental regulations, higher performance finishes with improved properties, continued development of solventless technologies such as powder coatings and radiation curable coatings, and new application methods with improved transfer efficiencies.

The changes will be accelerated by the proposed amendments to the U.S. Clean Air Act. The new environmental laws will require industry through the EPA and state and local agencies to further reduce emissions of VOC's which are contributors to ozone formation in the lower atmosphere. The focus of the paper will be to examine the paints and coatings industry and those pollution prevention methods that are being applied to meet these environmental pressures. It will review the life cycle of paints and coatings; from its inception in the manufacturing facility, to its ultimate application and disposal. It will also review developing low VOC technologies that are being considered worldwide to comply with increasing VOC regulations. (Copyright (c) 1992 Elsevier Science Publishers B.V.)

Keywords: *Pollution abatement, *Coating processes, *Air pollution abatement, *Waste management, Environmental chemical substitutes, Pollution regulations, Industrial wastes, Clean Air Act, Paints, Solvents, Technology utilization, Waste recycling, Waste utilization, Reprints, Waste minimization, Source reduction.

PB92-153345/REB PC **A01**/MF **A01**
AI and the Environment: Knowledge-Based Tools for Environmental Decision Makers. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
D. Greathouse, and J. Decker. c1991, 5p EPA/600/J-92/078
Pub. in PC AI - Intelligent Solutions for Desktop Computers, Nov/Dec 91. See also PB92-171447.

The issues that must be evaluated by persons both in the U.S. Environmental Protection Agency (U.S. EPA) and in firms contracted for environmental remediation work present many complex and difficult problems. The amount of specialized information that must be evaluated as part of higher-level decision processes is expanding. At the same time, there is a scarcity of persons with adequate training and experience to evaluate all of the data required to make appropriate decisions. The situation has created a need for increasing application of automated decision support software. The EPA Risk Reduction Engineering Laboratory (RREL), formerly the Hazardous Waste Engineering Research Laboratory, was one of the early participants in knowledge system development and evaluation within the U.S. EPA. Some of the history of this group's work, the nature of the decision processes conducted within Agency, and the relationship between these processes and the knowledge-based system work at RREL are discussed in the paper. In broader scope, the paper discusses the current status of expert systems in the Agency and the projected future of knowledge-based applications within the community of environmental engineers, scientists, and regulators.

Keywords: *Expert systems, *Environmental management, *Environmental effects, *Knowledge bases(Artificial intelligence), Environmental engineering, Pollution regulations, Decision making, US EPA, Specialized training, Research and development, Reprints.

PB92-153352/REB PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Zooplankton Population Dynamics in Experimentally Toxified Pond Ecosystems. Journal article.
Oak Ridge National Lab., TN.
M. E. Sierszen, H. L. Boston, and M. J. Horn. c1991, 8p EPA/600/J-92/079
Contract ACO5-840R21400
Pub. in Verh. Internat. Verein. Limnol., v24 p1517-1521, Jun 91. See also DE89016291. Sponsored by Department of Energy, Washington, DC., and Environmental Research Lab.-Duluth, MN.

To evaluate ecosystem response to and recovery from toxic contamination, the authors added phenolic compounds to a series of experimental ponds. Toxicants were added repeatedly in a temporally staggered sequence to evaluate the influence of seasonal factors and previous exposure history on the responses to toxicant stress. The authors hypothesized that seasonal changes in ecosystem structure, e.g. shifts in the relative importance of 'to-down' and 'bottom-up controls on energy flow (Bartell et al. 1988), would influence the system-level responses to the toxicant. Information from these experiments is being incorporated into models that predict ecological risk and system-level behavior under toxicant stress. The study focuses on the responses of zooplankton populations to toxicants and factors which may affect the apparent severity of toxic effects.

Keywords: *Zooplankton, *Water pollution effects(Animals), *Aquatic ecosystems, *Phenols, *Population dynamics, Bioassay, Chlorophyll, Seasonal variations, Biomass, Reprints.

PB92-153360/REB PC **A02**/MF **A01**
Physical and Chemical Control of Released Microorganisms at Field Sites. Journal article.
Corvallis Environmental Research Lab., OR.
K. Donegan, R. Seidler, and C. Matyac. c1991, 6p EPA/600/J-92/080
Pub. in Canadian Jnl. of Microbiology, v37 p708-712. See also PB89-138465 and PB91-109975. Prepared in cooperation with NSI Technology Services Corp., Corvallis, OR. Environmental Research Lab.

An important consideration in the environmental release of a genetically engineered microorganism (GEM) is the capability for reduction or elimination of GEM populations once their function is completed or if adverse environmental effects are observed. The decontamination treatments of burning and biocide application, alone and in combination with tilling, were evaluated for their ability to reduce populations of bacteria released on the phylloplane. Field plots of bush beans sprayed with the bacterium Erwinia herbicola, received the following treatments: (1) control, (2) control + till, (3) burn, (4) burn + till, (5) Kocide (cupric hydroxide), (6) Kocide + till, (7) Agri-strep (streptomycin sulfate), and (8) Agri-strept + till. Leaves and soil from the plots were sampled -1, 1, 5, 8, 12, 15, 19, and 27 days after application of the decontamination treatments. Burning produced a significant and persistent reduction in the number of bacteria whereas tilling, alone or in combination with the biocide treatments, stimulated a significant and persistent reduction in the number of bacteria, whereas tilling, alone or in combination with the biocide treatments, stimulated a significant increase in bacterial populations that persisted for several weeks.

Keywords: *Microorganisms, *Genetic engineering, Decontamination, Field tests, Biocides, Farm crops, Legumes, Survival, Regression analysis, Soil microbiology, Leaves(Botany), Combustion, Microbial colony count, Reprints, Erwinia herbicola.

PB92-153378/REB PC **A02**/MF **A01**
NSI Technology Services Corp., Corvallis, OR. Environmental Research Lab.
Nutrient Leaching from Conifer Needles in Relation to Foliar Apoplast Cation Exchange Capacity. Journal article.
Corvallis Environmental Research Lab., OR.
D. P. Turner, and H. J. van Broekhuizen. c1992, 6p EPA/600/J-92/081
Pub. in Environmental Pollution, v75 p259-263 1992. See also PB90-132697 and PB90-245242. Prepared in cooperation with Agricultural Univ., Wageningen (Netherlands). Sponsored by NSI Technology Services Corp., Corvallis, OR. Environmental Research Lab.

Limited evidence to date suggests that acidic precipitation promotes leaching of nutrient cations from conifer foliage. In order to evaluate the relative contribution of the apoplast cation exchange complex and symplast nutrient pools to the leached ions, the magnitude of potential foliar leaching in response to acidic precipitation was compared to foliar apoplast cation exchange capacity (CEC) for two conifer tree species (Pseudotsuga menziesii and Picea engelmanii). Leaching increased with decreasing pH and increasing time of immersion. At pH 2.1 and 3.1, equivalents of H+ depleted from the acidic solutions approximated equivalent of cations gained by the solutions. Maximum amounts leached were less than 40 micro equiv/g dry weight of needles for all ions combined. Measured foliar apoplast CEC for these species was approximately 120 micro equiv/g dry weight of needles. These relative magnitudes indicated that the apoplast provided the leached ions.

Keywords: *Forest trees, *Softwoods, *Air pollution effects(Plants), *Acid rain, Leaching, Cation exchanging, Nutrients, Conifers, Seedlings, Spruces, Fir trees, Pseudotsuga menziesii, Picea engelmanii.

PB92-153386/REB PC **A03**/MF **A01**
Corvallis Environmental Research Lab., OR.
Evaluation of Wetland Development and Waterbird Response at Elk Creek Wildlife Management Area, Lake Mills, Iowa, 1961 to 1990. Journal article.
Texas A and M Univ., College Station.
M. Weller, G. W. Kaufmann, and P. A. Vohls. c1991, 12p EPA/600/J-92/082
Pub. in Wetlands, v11 n2 p245-262 1991. See also PB90-149758, PB90-149766 and PB90-186149. Prepared in cooperation with Loras Coll., Dubuque, IA. Dept. of Biology, and Iowa Cooperative Fishery Research Unit, Ames. Sponsored by Corvallis Environmental Research Lab., OR.

A waterfowl habitat development project along 7.5 miles (12.07 km) of stream was evaluated after 27 years. There was a modest 12% net increase in wetlands in impounded areas, but much of the wetland vegetation changed from seasonally flooded, nonpersistent and persistent emergents to shallow, open-water areas. An unimpounded, downstream reference area had drier plant communities, probably resulting from reduced flooding. The loss of shallow vegetated wetlands could have significant impacts on both water quality functions and waterbird populations. The overall project goal of increasing numbers and diversity of waterfowl was met, but waterfowl numbers and species composition changed more because of transplanting and nest-box programs than habitat modifications. Although impacts on birds of shallow wetlands such as rails and songbirds were not quantitatively assessed, it is likely that the numbers of such birds were reduced because their preferred habitats were reduced markedly. Use of smaller, lateral impoundments and increased management for emergents would diversify waterbird populations and increase dabbling duck production.

Keywords: *Wildlife, *Birds, *Wetlands, *Waterfowl, Animal behavior, Species diversity, Vegetation, Population dynamics, Aerial photography, Seasonal variations, Habitat, Reprints, *Elk Creek Wildlife Management Area.

PB92-153394/REB PC **A03**/MF **A01**
Sulfate Retention and Cation Leaching of Forest Soils in Response to Acid Additions. Journal article.
Corvallis Environmental Research Lab., OR.
W. J. Fasth, M. B. David, and G. F. Vance. c1992, 12p EPA/600/J-92/083
Pub. in Canadian Jnl. of Forest Research, v21 p32-41. See also PB92-108182. Prepared in cooperation with Washington Univ., Seattle, and Illinois Univ. at Urbana-Champaign. Dept. of Forestry.

Much research within the past decade has focused on the effects of increased sulfur (S) deposition on surface waters. As inputs of S deposition as SO4(2-) build up in the soil over time, the concentration of SO4(2-) leaching from soils may also increase. Leachate SO4(2-) concentrations were greater for the high-S than for the low-S treatment for each soil type, resulting in greater cation leachate concentrations for soils that received the high-S treatment. Calcium was the primary base cation in both the Spodosol and Alfisol leachates. Declining concentrations of base cations and NH4(+) over the length of the study led to an increase in Al(3+) concentrations and decrease in pH for some of the Spodosol leachates. It is difficult to extrapolate their laboratory rates of change to the BBWM catchments because of differences between the experiment and field conditions. Soil temperature, the amount and rate of S application, and the total mass of soil exposed to treatment were hypothesized to be important factors affecting net S retention in Spodosols under field conditions. However, the authors feel that SO4(2-) adsorption under field conditions would still be the primary mechanism of S retention because of similarities between SO4(2-) concentrations in treatment solutions used for the present experiment and those in natural throughfall solutions.

Keywords: *Forest land, *Soil analysis, *Acidification, *Air land interactions, *Sulfates, *Land pollution, Leaching, Cations, Soil treatment, Concentration(Composition), Adsorption, Throughfall, Deposition, Soil chemistry, Reprints.

PB92-153402/REB PC **A03**/MF **A01**
Ten Year Review of Plastics Recycling. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

S. G. Howell. 1992, 24p EPA/600/J-92/085
Pub. in Jnl. of Hazardous Materials, v29 n2 p143-164.
See also PB81-242273 and PB-250 705.

A short history of the practice of plastics recycling as practiced in the United States and Europe for the past ten years indicates that much progress has been made in educating the public sector about the environmental damage done by the indiscriminating disposal of plastic items and potential opportunities to recycle them. Recent legislation has made the collection of some discarded plastic articles more efficient, and has provided economic incentives to recover and reuse waste plastics. A discussion of the methods of collecting, separating, cleaning, and fabrication of plastic wastes into useful items leads to the conclusion that much work is yet to be done to develop more efficient ways to perform these tasks. In addition, improvements in blending the disparate plastic materials in wastes could lead to the production of better products made from recycled materials. The public must be made aware of the fact that consumer products made of recycled plastics are often as good as those made of virgin material. And that the resulting environmental benefits as well as energy savings are for the common good. (Copyright (c) 1992 Elsevier Science Publishers B.V.)

Keywords: *Plastics recycling, *Waste management, *Waste recycling, Reviews, Public information, Pollution regulations, Waste disposal, Materials recovery, Consumer products, Pollution sources, Separation, United States, Europe, Reprints, Foreign technology.

PB92-153410/REB PC A06/MF A02
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Technology Evaluation Report: SITE Program Demonstration of the DuPont/Oberlin Microfiltration Technology.
PRC Environmental Management, Inc., Chicago, IL.
J. F. Martin. Mar 92, 109p EPA/540/5-90/007
See also PB92-119023. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

In April and May 1990, the U.S. Environmental Protection Agency (EPA), under the Superfund Innovative Technology Evaluation (SITE) program, demonstrated Dupont/Oberlin's microfiltration system at the Pamerton Zinc Superfund (PZS) site in Palmerton, Pennsylvania. The microfiltration system combines Dupont's Tyvek T-980 filter media with Oberlin's automatic pressure filter and is designed to remove solids larger than 0.1 micron in diameter from liquid wastes. The microfiltration system demonstrated at the PZS site was evaluated primarily in terms of its ability to remove metals (mainly zinc) and particulates from the contaminated groundwater on site, while producing a dry filter cake and filtrate that meet applicable disposal requirements.

Keywords: *Water pollution control, *Land pollution control, *Hazardous materials, *Superfund, *Remedial action, *Liquid wastes, Waste disposal, Zinc, Metals, Particulates, Filters, Performance evaluation, Design criteria, *Microfiltration, *DuPont/Oberlin Microfiltration Treatment.

PB92-153428/REB PC A16/MF A03
Environmental Monitoring Systems Lab., Las Vegas, NV.
Direct/Delayed Response Project: Soil Characterization Comparison.
Lockheed Engineering and Sciences Co., Inc., Las Vegas, NV. Environmental Programs Office.
L. K. Fenstermaker, G. E. Byers, T. H. Starks, M. J. Miah, and C. J. Palmer. 28 Feb 92, 371p EPA/600/4-91/008
See also PB87-227468, PB88-103825, PB90-219395 and PB90-246513. Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

A large amount of soil characterization data has been collected as a component of the Direct/Delayed Response Project (DDRP) in the acid rain Aquatic Effects Research Program. An interlaboratory comparison study was undertaken to identify the comparability of the data to that obtained from representative soil characterization laboratories. Participating laboratories were selected at random from four regions of the U.S. and two regions of Canada. Two original DDRP contract laboratories also participated. Duplicate samples of six soil audit materials and two liquid soil extracts were sent to each of the laboratories in two separate batches. Laboratories used their own protocols to perform the analyses requested except for the contract laboratories which followed the DDRP protocol. Liquid audits were used in an effort to identify if interlaboratory differences were due to extraction procedures or chemical measurements. A component of the variability in the results was attributed to differences in the methods used such as soil/solution ratios, extractants or extraction procedures. The largest number of different methods used was for the measurement of cation exchange capacity. The results between the DDRP soil survey data and the study's results were compared using Youden-pair plots. In addition, standard statistical tests were performed. Overall, the DDRP data were comparable to the data from the study. However, out of the total 141 comparisons involving results from six or more laboratories, the results from the two contract laboratories did not meet the comparison criteria in 19 cases. Since there was never a case in which both contract laboratories failed, it would appear that the 19 cases which were not comparable were due to random analytical errors, incorrectly reported results, or misapplication of DDRP protocol.

Keywords: *Soil surveys, *Acidification, *Interlaboratory comparison, *Land pollution, *Data analysis, Soil analysis, Quality assurance, Extraction, Cation exchanging, Auditing, Sampling, Water pollution, Deposition, Acid rain, *Direct/Delayed Response Project.

PB92-153436/REB PC A07/MF A02
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Separation of Hazardous Organics by Low Pressure Membranes: Treatment of Soil-Wash Rinse-Water Leachates. Rept. for Jan 90-Jan 92.
Kentucky Univ., Lexington. Dept. of Chemical Engineering.
D. Bhattacharyya, and A. Kothari. Mar 92, 141p EPA/600/R-92/035
Grant EPA-R-814491
See also PB87-214870 and PB91-234625. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Soil washing is a promising technology for treating contaminated soils. In the present work, low-pressure, thin-film composite membranes were evaluated to treat the soil-wash leachates so that the treated water could be recycled back to the soil washing step. Experiments were done with SARM (Synthetic Analytical Reference Matrix) soils. Membrane performance was evaluated with leachates obtained from different wash solutions. The effect of fine suspensions in the leachates was also studied. A solution-diffusion model was modified to include an adsorption resistance term in water flux, and this term was correlated with bulk concentration using the Freundlich isotherm. The correlation was then used to predict water flux drop at different bulk concentrations or to predict water flux at different recoveries. Thin-film composite membranes were found to effectively treat the leachate from rinse water used to wash contaminated soil. In addition, feed preozonation significantly improved water flux.

Keywords: *Water pollution abatement, *Waste water, *Land pollution control, *Membranes, Soil treatment, Performance evaluation, Recycling, Leaching, Separation, Hazardous materials, Organic compounds, Filtration, Osmosis, Experimental design, *Soil washing, *Low pressure membranes.

PB92-153444/REB PC A05/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Automotive and Heavy-Duty Engine Coolant Recycling by Distillation: Technology Evaluation Report.
Battelle Columbus Div., OH.
A. R. Gavaskar, R. E. Olfenbuttel, and J. A. Jones. Mar 92, 79p EPA/600/R-92/024
Contract EPA-68-CO-0003
See also PB92-126804. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The evaluation addresses the product quality, waste reduction, and economic issues involved in recycling automotive and heavy-duty engine coolants for a facility such as the New Jersey Department of Transportation garage in Ewing, New Jersey. The specific recycling evaluated is based on the technology of distillation. Coolant recycling was found to have good potential as a means of waste reduction and cost saving with a return on investment of greater than 300% in the first year. Product quality was evaluated by conducting selected performance tests recommended in ASTM D 3306 and ASTM D 4985 standards, and by chemical characterization of the spent, recycled, and virgin coolants. A good product quality of the recycled coolant was also achieved by the unit. Boiling, freezing, and corrosion resistance functions of the coolant were restored and contaminant levels were considerably reduced.

Keywords: *Motor vehicle engines, *Cooling systems, *Waste recycling, *Coolants, Automobiles, Heavy duty vehicles, Distillation, Economic analysis, Quality, Product development, Waste minimization, Source reduction.

PB92-153451/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Biological Activity and Potential Remediation Involving Geotextile Landfill Leachate Filters.
Drexel Univ., Philadelphia, PA. Geosynthetic Research Inst.
G. R. Koerner, and R. M. Koerner. c1992, 14p EPA/600/A-92/053
Grant EPA-R-818565
See also PB91-213660. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The paper presents the results of a biological growth study in geotextile filters used in landfill leachate collection systems. After reviewing the first year's activity, a completely new experimental approach has been taken. Using 100 mm diameter columns for the experimental incubation and flow systems, the effects of six landfill leachates are evaluated. Aerobic and anaerobic states, four different geotextiles, and soil/no soil conditions above the geotextiles are involved in the testing program. The results in 96 individual test columns. Flow data is measured regularly, and over the first six months of evaluation certain trends were observed. For two of the landfill leachates, backflushing has been attempted so as to reinstitute flow. The procedure works well for the geotextile alone while not as well for the geotextile/soil columns. The exception is the nonwoven heat set geotextile. All tests are still ongoing and will be dismantled and further investigated at the end of 12 months exposure time. The experimental setup and procedure has been written up as a tentative ASTM test method and is currently in task group review.

Keywords: *Waste disposal, *Land pollution control, *Soil filters, *Geotechnical fabrics, Leaching, Earth fills, Aerobic processes, Anaerobic processes, Environmental transport, Performance evaluation, Biological effects, Remedial action, Reprints, *Geosynthetic materials.

PB92-153725/REB PC A03/MF A01
Assessment of Diagnostic Measurements for Selection for Residential Radon Mitigation. Rept. for Oct 87-Jan 88.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
A. G. Scott, and D. C. Sanchex. c1992, 14p EPA/600/A-92/046
Presented at CSCE/ASCE Conference on Environmental Engineering, Vancouver, B.C., July 13-15, 1988. See also PB92-108109. Prepared in cooperation with American Atcon, Inc., Mississauga (Ontario).

The paper discusses and critiques EPA's experience in conducting house evaluation visits in Florida and Ohio. Suggestions are offered as to the utility and priority to be given to selected diagnostic procedures and measurements. EPA has an experimental program to develop and demonstrate cost effective radon mitigation techniques. Most of the work is carried out in occupied houses with elevated radon concentrations. The study house selection process starts with monitoring surveys that establish an area as one with elevated radon concentrations in houses. Radon detectors are usually distributed with a questionnaire, which requests information on location (at least the ZIP Code level) and some indication of building style in addition to radon concentration. The survey identifies problem areas and housing types of the greatest experimental interest. If the pool of candidate houses is larger than the number that can be worked on, as is usually the

case, then house evaluation visits to the candidate houses are conducted in order to provide the information needed to make a selection of study houses from among the candidates.

Keywords: *Radon, *Air pollution sampling, *Indoor air pollution, *Pollution control, *Environmental monitoring, Concentration(Composition), Residential buildings, Mitigation, Houses, Cost effectiveness, Measurement, Land pollution control, Florida, Ohio, Path of pollutants, Environmental transport, Active Soil Depressurization Systems.

PB92-153733/REB PC **A03/MF A01**
Technology for Reduction of CO2 Emissions from the Transportation Sector. Rept. for Mar 91-Jan 92.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
R. H. Borgwardt. 1992, 12p EPA/600/A-92/047
See also PB90-225806, DE90010016, PB91-182675 and DE91011971. Presented at the International Conference on Carbon Dioxide Removal (1st), Amsterdam, The Netherlands, March 3-6, 1992.

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

Keywords: *Air pollution abatement, *Carbon dioxide, *Exhaust emissions, *Alternate fuels, Mobile pollutant sources, Methanol fuels, Energy source development, Biomass, Cost analysis, Motor vehicles, Alcohol fuels, *Hydrocarb process.

PB92-153741/REB PC **A03/MF A01**
Global Carbon Cycle and Climate Change. Book chapter.
Corvallis Environmental Research Lab., OR.
R. K. Dixon. 1992, 11p EPA/600/A-92/048
Pub. in The Science of Global Change: The Impact of Human Activities on the Environment, 1992. See also PB92-121359.

The production of greenhouse gases due to anthropogenic activities may have begun to change the global climate. The global carbon cycle plays a significant role in projected climate change. However, considerable uncertainty exists regarding pools and flux in the global cycle. Given the authors present understanding of current global carbon sources and sinks, feedbacks from the biosphere are likely to influence the process of climate change. Opportunities may exist to manage the biosphere and reduce the accumulation of greenhouse gases in the atmosphere. The four chapters in this section survey the role of the global carbon cycle in projected climate change.

Keywords: *Carbon cycle, *Climatic changes, *Air pollution, *Natural resources management, Global aspects, Natural emissions, Air-biosphere interactions, Greenhouse effects, Carbon dioxide, Terrestrial ecosystems, Biogeochemistry, Vegetation, Organic matter, Forest management.

PB92-153758/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Ductile-to-Brittle Transition Time in Polyethylene Geomembrane Sheet. Book chapter.
Drexel Univ., Philadelphia, PA. Geosynthetic Research Inst.
Y. H. Halse, A. E. Lord, and R. M. Koerner. 1992, 10p EPA/600/A-92/049
Grant EPA-R-815692
Pub. in Geosysthetic Testing for Waste Containment Applications, p95-109. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The susceptibility of polyehtylene (PE) geomembranes to stress cracking was evaluated in the laboratory using an accelerated notched constant load testing (NCLT) method. The test specimens were subjected to various stress levels which ranged from 25% to 70% of the yield stress at 50C. The ductile-to-brittle failure curves of five different geomembranes were obtained by plotting the logarithm of percent yield stress against the logarithm of average failure time. The stress cracking resistance (SCR) is quantified as the value of the ductile-to-brittle transition time. The results show that SCR of these geomembrane sheets vary over a wide range from a minimum of 4 hours to over 600 hours.

Keywords: *Polyethylene, *Geotechnical fabrics, *Membranes, *Cracking(Fracturing), Mechanical tests, Ductility, Failure, Fatigue(Materials), Loads(Forces), Deformation, Yield strength, Mechanical properties, Crack propagation, Brittleness, Reprints.

PB92-153766/REB PC **A02/MF A01**
Environmental Protection Agency's Municipal Solid Waste Landfill Liner Design Criteria.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. E. Landreth. 1992, 10p EPA/600/A-92/050
Pub. in Technical Sessions of GRCDA's Annual International Solid Waste Exposition (28th), August 20-24, 1990, Vancouver, B.C. See also PB85-100832, PB85-100840, PB87-151072, PB87-175378 and PB89-129670.

The soon to be published non-hazardous land disposal regulation, RCRA sub title D (40 CFR Parts 257 and 258) must achieve three objectives. The first is to be protective of human health and the environment, second to be flexible so as not to stifle innovative designs, and third to allow individual states the latitude to develop state specific regulations. The containment systems (liners) currently under consideration will achieve these three goals. The paper will briefly discuss the approach to the liner design. Additional information will be forth coming as final decisions are made.

Keywords: *Land pollution control, *Linings, *Waste disposal, *Municipal wastes, *Earth fills, Leaching, Environmental transport, Design criteria, Pollution regulations, Performance evaluation, Geosynthetic materials, Resource Conservation and Recovery Acts.

PB92-153774/REB PC **A02/MF A01**
Waste Minimization for Non-Agricultural Pesticide Applicators: EPA's Pollution Prevention Guide.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
T. M. Harten. 1992, 10p EPA/600/A-92/051
Pub. in Proceedings of International Workshop on Research and Pesticide Treatment, Disposal, and Waste Minization, Cincinnati, OH. February 26-27, 1991, p136-143.

U.S. EPA's Office of Research and Development is preparing a guide to be published later this year for non-agricultural pesticide applicators which will provide specific information about waste minimization for pesticide users in industries such as commercial lawn care, structural pest control, greenhouse operations, and forestry. The paper summarizes the major recommendations to be included in the upcoming manual for waste source reduction and recycling within the operational activities of subject industry. Examples include implementation of an integrated pest management program, inventory control and storage, product substitution, containers and packaging changes, and improved mixing and application technology. The guide is one in a series of industry-specific pollution prevention guides that EPA is publishing in cooperation with the California Department of Health Services. The first guide in the series, published in 1990, described waste reduction opportunities in the pesticide formulating industry.

Keywords: *Pollution abatement, *Pesticide residues, *Waste management, *Pesticides, Guidelines, Waste recycling, Storage, Environmental chemical substitutes, Mixing, Pest control, Industrial wastes, Reprints, *Waste minimization.

PB92-153782/REB PC **A03/MF A01**
GAC Adsorption of a Mixture of Natural Organic Matter and VOCs in the Presence and Absence of Molecular Oxygen.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
R. D. Vidic, G. A. Sorial, S. P. Papadimas, T. F. Speth, and M. T. Suidan. 1991, 21p EPA/600/A-92/052
Presented at the American Water Works Association Annual Conference, Philadelphia, PA., June 23-28, 1991. See also PB87-100657. Prepared in cooperation with Cincinnati Univ., OH. Dept. of Civil and Environmental Engineering.

In an attempt to determine the effects of molecular oxygen on activated carbon adsorption modeling, isotherms, microcolumns, and pilot-columns are completed in the presence and absence of molecular oxygen. The results show that in oxic conditions, natural organic matter has a higher adsorption capacity than in anoxic conditions. Molecular oxygen does not affect the adsorption capacity of target compounds in distilled water, however in the presence of natural organic matter, the adsorption capacity of the target compounds decrease in oxic conditions due to an increased competitive effect from the natural organic matter. The results also show that the constant-diffusivity scale-up approach is more accurate under these conditions than the linear-diffusivity scale-up approach.

Keywords: *Oxygen, *Water treatment, *Adsorption, *Chlorohydrocarbons, *Organic wastes, Beds(Process engineering), Activated carbon, Leachates, Sanitary landfills, Isotherms, *Natural organic matter.

PB92-153790/REB PC **A01/MF A01**
Simulation Results of Single Refrigerants for Use in a Dual-Circuit Refrigerator/Freezer. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
J. C. Bare. c1992, 4p EPA/600/J-92/087
Pub. in Jnl. of Air and Waste Management Association, v42 n2 p185-186, Feb 92. See also DE88752836 and PB90-262833.

The paper reviews the refrigerant/freezer (RF) design and refrigerant selection process that is necessary to design an energy efficient RF that does not use fully halogenated chlorofluorocarbons (CFCs). EPA is interested in phasing out CFCs in RFs to minimize stratospheric ozone depletion while simultaneously making RFs more energy efficient to minimize global warming. Dual-circuit RFs have been shown to have a theoretical advantage over single-evaporator RFs, since evaporation may occur at a higher pressure in the fresh food loop of a dual-circuit system. Single refrigerants were simulated in a computer model to determine the optimum pure refrigerant in each of the two separate freezer and fresh food loops. R-152a was determined to be the optimum single refrigerant in the freezer, and R-142b and R-152a were determined to be the optimum single refrigerants in the fresh food section. With the assumptions made, theoretical energy savings of up to 23% are possible. The ideal RF should be safe, energy efficient, and inexpensive.

Keywords: *Refrigerants, *Air pollution abatement, *Environmental chemical substitutes, *Refrigerators, *Energy conservation, Dual-cycle cooling system, Freons, Ozone depletion, Fluorohydrocarbons, Freezers, Dichlorodifluoromethane, Pollution sources, Design criteria, Computerized simulation, Global warming, Reprints.

PB92-153808/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
Effects of Building Features on Indoor Air and Pollutant Movements. Journal article.
Acurex Corp., Research Triangle Park, NC.
J. C. S. Chang, and Z. Guo. c1992, 11p EPA/600/J-92/088
Contract EPA-68-D0-0141
Pub. in Building Research Jn.., v1 n1 p55-63 1992. See also PB91-205153. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The paper discusses full-scale residential building tests to determine the effects of building features on indoor air and pollutant movement. It was found that the activated heating and air-conditioning (HAC) system served as a conductor that enhanced the indoor air movement and transported the pollutants from their sources to the rest of the house. The Interior door functioned either as a barrier or as a channel for

the air exchange between the room and the rest of the house. The outside window brought about leaks. The area exhaust fan was a very effective pollutant remover when properly used. It is recommended that either an outside window or an exhaust fan be installed in rooms where indoor pollutants may occur. If indoor air pollutants are accidentally released, it is recommended that the source be isolated by closing the door of the room and turning off the HAC system. Outside windows should be open and the area exhaust fan in the polluted room should be kept on for several hours to completely dissipate the indoor air pollutants.

Keywords: *Indoor air pollution, *Residential buildings, Space HVAC systems, Ventilation, Windows, Air flow, Air infiltration, Air pollution control, Reprints.

PB92-153816/REB PC A02/MF A01
Environmental Research Lab., Athens, GA.
Reduction of Nitrobenzene by Four Sulfide Minerals: Kinetics, Products, and Solubility. Journal article.
Technology Applications, Inc., Athens, GA.
Y. S. Yu, and G. W. Bailey. c1992, 10p EPA/600/J-92/089
Contract EPA-68-C1-0024
Pub. in Jnl. of Environmental Quality, v21 n1 p86-94, Jan-Mar 92. Sponsored by Environmental Research Lab., Athens, GA.

Nitrobenzene was used as a molecular probe to study electron donor properties of four sulfide minerals. Nitrobenzene was selected as a probe because its reaction in aqueous systems has been well characterized. Suspensions of the four minerals were reacted with nitrobenzene under anaerobic conditions for various time periods. Nitrobenzene and its reaction products in both the solution and the solid phase were analyzed by liquid chromatography and UV-visible spectroscopy. The observed half-lives of nitrobenzene are 7.5, 40, 105, and 360 h, respectively, for reactions with sodium sulfide (Na2S0, alabandite (MnS), sphalerite (ZnS), and molybdenite (MoS2) under anaerobic conditions, at a 0.24 mol/L 1 water-mineral mixture concentration. The log plot of calculated sulfide ion concentration of minerals versus reaction half-life shows a linear relationship. Nitrobenzene reduction by sulfide minerals is a solution phenomenon. The sulfide mineral dissolution rate and its solubility, however, influence the reduction rate. (Copyright (c) 1992, ASA, CSSA, SSSA.)

Keywords: *Nitrobenzenes, *Sulfide minerals, *Reduction(Chemistry), Reaction kinetics, Dissolving, Solubility, Reprints.

PB92-153824/REB PC A02/MF A01
Hydroxyl Radical Formation in Aqueous Reactions (pH 3-8) of Iron(II) with Hydrogen Peroxide: The Photo-Fenton Reaction. Journal article.
Environmental Research Lab., Athens, GA.
R. G. Zepp, B. C. Faust, and J. Holgne. c1992, 9p EPA/600/J-92/090
Pub. in Environmental Science and Technology, v26 n2 p313-319, Feb 92. See also AD-A221-119, PB263196 and PB84-157148. Prepared in cooperation with Eidgenoessische Anstalt fuer Wasserversorgung, Abwasserreinigung und Gewaesserschultz, Duebendorf (Switzerland).

Kinetics studies of the indirect photooxidation of trace hydroxyl radical (OH) probes in aqueous solutions were used to evaluate the nature and formation efficiency of the transient oxidants that are generated when hydrogen peroxide reacts with Fe(II) that is produced from photoreduction of Fe(III) at wavelength 436 nm. Results of studies of these 'photo-Fenton reactions' under various test conditions are in good agreement with the hypothesis that Fe(sup 2+) and its oxalate, citrate, and phosphate complexes react with H2O2 efficiently to produce OH in water at pH values ranging from 3 to 8. Such reactions involving Fe(II) and H2O2 provide a generally important pathway for oxidations in the environment and possibly for the treatment of contaminated waters. (Copyright (c) 1992 by the American Chemical Society.)

Keywords: *Hydroxyl radicals, *Hydrogen peroxide, *Photochemical reactions, *Reaction kinetics, Oxidation, Water pollution, Reprints, Photo-Fenton reactions, Pollutant fate.

PB92-153832/REB PC A03/MF A01
Trends in Catskill Stream Water Quality: Evidence from Historical Data. Journal article.
Corvallis Environmental Research Lab., OR.
J. L. Stoddard. c1991, 12p EPA/600/J-92/091
Pub. in November Water Resources Research, v27 n11 p2855-2864 1991. See also PB87-110383, PB90-100058 and PB90-265208. Prepared in cooperation with New York City Dept. of Environmental Protection, Valhalla. Kensico Lab.

Historical data for large streams in the Catskill Mountains indicate that acidic deposition has significantly influenced water quality, but that this effect is most observable in early (pre-1945) data, and consists primarily of increased base cation (CaMg) concentrations. More recent data suggest that landscape disturbance currently exerts a stronger influence on acid/base status of large streams than does acidic deposition, resulting in increases in both CaMg and acid-neutralizing capacity (ANC). Estimates of SO4(2-) concentration indicate that SO4(2-) is a conservative ion in the Catskills, and stream water concentrations have decreased since reaching maximum values around 1970, consistent with temporal trends in emissions and deposition in the northeastern United States. Nitrate concentrations, on the other hand, have increased substantially in all but one stream in the past two decades, independent of any change in nitrogen deposition in the region; changes in the capacity of watersheds to retain nitrogen are hypothesized as causes of increased stream water NO3(-). In small, undisturbed streams, increases in NO3(-) and decreases in CaMg appear to offset the effects of reduced SO4(2-), and lead to decreasing trends in ANC. (Copyright (c) 1991 by the American Geophysical Union.)

Keywords: *Water quality data, *Streams, *Acidification, *Water pollution sampling, Deposition, Trends, Catskill Mountains, Air pollution, Air water interactions, Cations, Nitrates, pH, Acid neutralizing capacity, Concentration(Composition), Specific conductivity, Environmental surveys, Reprints, Calcium magnesium.

PB92-153840/REB PC A03/MF A01
Selection of a Base Serum for the Preparation of Quality Control Pools Containing Environment Analytes. Journal article.
Corvallis Environmental Research Lab., OR.
V. W. Burse, M. P. Korver, P. M. McClure, D. J. Buckley, and J. Nassif. c1992, 18p EPA/600/J-92/092
Pub. in Analytical Letters, v25 n1 p21-36 1992. Prepared in cooperation with Centers for Disease Control, Atlanta, GA., and Massachusetts Dept. of Public Health, Boston. Center for Labs. and Communicable Disease Control.

At two laboratories, an analytical method to determine polychlorinated biphenyls (PCBs) in serum was evaluated for its ability to recover in vitro-spiked PCBs from bovine and human serum. Statistically significant differences ($p < 0.05$) were found in the results obtained for the two matrices at both laboratories. Previously an interlaboratory bias between the laboratories of +3.3% had been established by using bovine serum; however, with human serum the average interlaboratory bias was -9.5% resulting in a change in absolute bias of approximately 13%. The analytes determined in the base materials before they were in vitro-spiked with PCBs were dichlorodiphenyldichloroethylene (p,p'-DDE), PCBs, and serum lipids (i.e., total cholesterol, triglycerides, free cholesterol and phospholipids). The concentration of analytes and lipids was higher in base human serum than in base bovine serum. (Copyright (c) 1992 by Marcel Dekker, Inc.)

Keywords: *Environmental pollutants, *Blood serum, *Blood chemical analysis, Polychlorobiphenyl compounds, Interlaboratory comparisons, Lipids, Quality control, Gas chromatography, Arochlors, Reprints.

PB92-153857/REB PC A03/MF A01
Leaf Photosynthetic and Water Relations Responses for 'Valencia' Orange Trees Exposed to Oxidant Air Pollution. Journal article.
Corvallis Environmental Research Lab., OR.
D. M. Olszyk, B. K. Takemoto, and M. Poe. c1991, 11p EPA/600/J-92/092
Pub. in Environmental and Experimental Botany, v31 n4 p427-436 1991. See also PB90-115148. Prepared in cooperation with California Univ., Riverside. Statewide Air Pollution Research Center.

Leaf responses were measured to test a hypothesis that reduced photosynthetic capacity and/or altered water relations were associated with reductions in yield for 'Valencia' orange trees (Citrus sinensis (L.), Osbeck) exposed to ambient oxidant air pollution. Exposures were continuous for 4 years to three levels of oxidants (in charcoal-filtered, half-filtered, and non-filtered air). Oxidants had no effect on net leaf photosynthetic rates or on photosynthetic pigment concentrations. A single set of measurements indicated that oxidants increased leaf starch concentrations (24%) prior to flowering, suggesting a change in photosynthate allocation. Leaves exposed to oxidants had small, but consistent, changes in water relations over the summer growing season, compared to trees growing in filtered air. Other changes included decreased stomatal conductance (12%) and transpiration (9%) rates, and increased water pressure potentials (5%). While all responses were subtle, their cumulative impact over 4 years indicated that 'Valencia' orange trees were subject to increased ambient oxidant stress.

Keywords: *Photosynthesis, *Air pollution effects(Plants), *Citrus trees, *Leaves(Botany), *Water, Fruit crops, Oxidants, Seasonal variations, Pigments, Starches, Transpiration, Reprints.

PB92-153865/REB PC A03/MF A01
Climate Change and Isoprene Emissions from Vegetation. Journal article.
Corvallis Environmental Research Lab., OR.
D. P. Turner, J. V. Baglio, D. Pross, B. D. McVeety, and D. L. Phillips. c1991, 21p EPA/600/J-92/094
Pub. in Chemosphere, v23 n1 p37-56. See also PB91-226480. Prepared in cooperation with ManTech Environmental Technology, Inc., Corvallis, OR., Oregon State Univ., Corvallis, and Battelle Pacific Northwest Labs., Richland, WA.

A global model was developed for estimating spatial and temporal patterns in the emission of isoprene from vegetation under the current climate and used to estimate emissions under doubled-CO2 climate scenarios. Current emissions were estimated on the basis of vegetation type, foliar biomass (derived from the satellite-generated Global Vegetation Index), and global databases for air temperature and photoperiod. The model had a monthly time step and the spatial resolution was 0.5 degrees latitude and longitude. Doubled-CO2 climate emissions were estimated based on predicted changes in the areal extent of different vegetation types, each having a specific rate of annual isoprene emissions. The global total for current emissions was 285 Tg. The calculated isoprene emissions under a doubled-CO2 climate were about 25% higher than current emissions due mainly to the expansion of tropical humid forests which had the highest annual emission rates. An increase in isoprene emissions is expected to increase atmospheric concentrations of ozone and methane which are important greenhouse gases, and thus act as a positive feedback to global warming. Detailed treatment of the question, however, will require incorporation of these emission surfaces into atmospheric chemistry models.

Keywords: *Climatic changes, *Natural emissions, *Mathematical models, *Vegetation, *Air pollution, *Isoprene, Global aspects, Carbon dioxide, Study estimates, Atmospheric composition, Ozone, Air-biosphere interactions, Methane, Greenhouse effects, Atmospheric chemistry, Spatial distribution, Temporal distribution, Non-methane hydrocarbons, Reprints.

PB92-153873/REB PC A02/MF A01
Ecological Regions versus Hydrologic Units: Frameworks for Managing Water Quality. Journal article.
Corvallis Environmental Research Lab., OR.
J. M. Omernik, and G. E. Griffith. c1991, 8p EPA/600/J-92/095
Pub. in Jnl. of Soil and Water Conservation, v46 n5 p334-340 1991. See also PB88-148978 and PB90-132416. Prepared in cooperation with NSI Technology Services Corp., Corvallis, OR. Environmental Research Lab.

In the mid-1970s a flurry of research and assessment activity began on nonpoint source (NPS) pollution. Much of the activity was driven by legislative requirements, particularly Section 208 of the Clean Water Act which required states to identify nonpoint sources of pollution and develop feasible procedures and methods to control these sources. Unfortunately, response

to the law was piecemeal--most states lacked a logical and useful spatial (geographical) framework to put the results in a meaningful environmental perspective. Spatial frameworks can have a profound influence on the effectiveness of the research, assessment, and management of many aquatic resource problems, particularly nonpoint source pollution. The authors believe that spatial frameworks based on ecological regions can often be more useful for assessing the health of aquatic systems than frameworks based only on hydrologic units, drainage basins, or administrative or political units. Their objective is to demonstrate the usefulness of the frameworks and approaches, and show the relative ineffectiveness of hydrologic units with examples at national, regional, and local scales.

Keywords: *Water quality management, *Ecology, *Water pollution effects, *Regional analysis, Spatial distribution, Hydrology, Environmental impact assessments, Comparison, Nonpoint sources, Clean Water Act, Pollution laws, Water pollution control, Reprints.

PB92-153899/REB PC **A03/MF A01**
Interlaboratory Study of Cellular Fluorescence Intensity Measurements with Fluorescein-Labeled Microbead Standards. Journal article.
NSI Technology Services Corp., Corvallis, OR. Environmental Research Lab.
R. F. Vogt, G. D. Cross, D. L. Phillips, L. O. Henderson, and W. H. Hannon. c1991, 13p EPA/600/J-92/096
Pub. in Cytometry, v12 p525-536 1991. Prepared in cooperation with Centers for Disease Control, Atlanta, GA.

Assessing and achieving interlaboratory comparability is a major quality assurance challenge for large interdisciplinary, multi-institutional, environmental research projects. Eight laboratories routinely measure chemical constituents of various field and laboratory derived solution samples as part of the US EPA's Watershed Manipulation Project. A quarterly interlaboratory comparison study has been designed by EPA quality assurance personnel in Corvallis, OR (USA) to assess: (1) intralaboratory precision and accuracy, (2) interlaboratory precision, and (3) trends through time. Synthetic solution samples are prepared quarterly and sent via overnight express to participating laboratories. For each analyte, laboratories are requested to perform analyses in triplicate with each replicate measured under different calibrations; precision calculated from resulting data therefore includes a component of among-batch variability. Relative bias is calculated as the percent difference between a laboratory's mean and the median of the laboratories (the supplying laboratory's value being treated equally to the other laboratories). Overall precision is expressed as the coefficient of variation using laboratory means. An ANOVA approach is also used to calculate significant differences among laboratories. Data interpretation and results from four quarterly evaluations will be presented.

Keywords: *Interlaboratory comparisons, *Environmental monitoring, *Data processing, *Research and development, Sampling, Case studies, Quality assurance, Error analysis, Quality control, Statistical analysis, Water pollution sampling, Reprints, *Watershed Manipulation Project.

PB92-153907/REB PC **A03/MF A01**
Trends and Patterns in Section 404 Permitting Requiring Compensatory Mitigation in Oregon and Washington, USA. Journal article.
Corvallis Environmental Research Lab., OR.
M. E. Kentula, J. C. Sifneos, J. W. Good, M. Rylko, and K. Kunz. c1992, 12p EPA/600/J-92/098
Pub. in Environmental Management, v16 n1 p109-119 1992. See also PB86-158656 and PB90-261512. Prepared in cooperation with Oregon State Univ., Corvallis. Coll. of Oceanography, and Corps of Engineers, Seattle, WA. Seattle District.

The effects of permitting decisions made under Section 404 of the Clean Water Act for which compensatory mitigation was required were examined. Information was compiled on permits issued in Oregon (1977-Jan 1987) and Washington (1980-1986). Data on the type of project permitted, wetland impacted and mitigation project were collected and analyzed. The records of the Portland and Seattle District Offices of the US Army Corps of Engineers and of Environmental Protection Agency Region X were the primary sources of information. The study illustrates how Section 404 permit data might be used in managing a regional wetland resource. However, because the data readily available were either incomplete or of poor quality, the process of gathering information was very labor-intensive. Since similar analyses would be useful to resource managers and scientists from other areas, development of an up-to-date standardized database is recommended.

Keywords: *Water management(Applied), *Permits, *Wetlands, *Water pollution, *Environmental protection, Trends, Clean Water Act, Oregon, Washington(State), Mitigation, Construction, Natural resources management, Pollution regulations, Aquatic ecosystems, Dredging, Reprints, Created wetlands, Dredge and Fill Law, EPA region 10.

PB92-153915/REB PC **A02/MF A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Permeation of Multifunctional Acrylates through Selected Protective Glove Materials. Journal article.
Little (Arthur D.), Inc., Cambridge, MA.
E. P. Renard, R. Goydan, and T. Stolki. c1992, 9p EPA/600/J-92/099
Contract EPA-68-C9-0037
Pub. in American Industrial Hygiene Association Jnl. v52 n2 p117-123, Feb 92. See also PB91-113316. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

In support of the Premanufacture Notification (PMN) program of the Environmental Protection Agency's Office of Toxic Substances, the resistance of three glove materials to permeation by multifunctional acrylate compounds was evaluated through a program for the Office of Research and Development. Several recent PMN submissions relate to multifunctional acrylates and essentially no permeation data are available for this class of compounds. To better understand permeation behavior, tests were conducted with trimethylolpropane triacrylate (TMPTA), 1,6-hexanediol diacrylate (HDDA), and two mixtures of HDDA with 2-ethylhexyl acrylate (EHA). None of the acrylate compounds nor mixtures was found to permeate to butyl or nitrile rubber under the test conditions. (Copyright (c) 1992, American Industrial Hygiene Association.)

Keywords: *Protective clothing, *Gloves, *Permeability, *Acrylates, *Rubber, Performance evaluation, Elastomers, Materials testing, Notification, Occupational safety and health, Reprints, Premanufacture Notification, ASTM F739 permeation method, Propane triacrylate/trimethylol, Hexane diol diacrylate.

PB92-153923/REB PC **A03/MF A01**
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Use of Four-Dimensional Data Assimilation in a Limited-Area Mesoscale Model Part 2: Effects of Data Assimilation within the Planetary Boundary Layer. Journal article.
Pennsylvania State Univ., University Park. Dept. of Meteorology.
D. R. Stauffer, N. L. Seaman, and F. S. Binkowski. c1992, 23p EPA/600/J-92/100
Contract EPA-R-81-4068-01
Pub. in Monthly Weather Review, v119 n3 p734-754 1991. See also AD-A208 573 and N88-11329. 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.

A four-dimensional data assimilation (FDDA) scheme based on Newtonian relaxation or nudging has been developed and evaluated in the Pennsylvania State University/National Center for Atmospheric Research (PSU/NCAR) Limited-Area Mesoscale Model. It was shown in Part I of the study that continuous assimilation of standard-resolution rawinsonde observations throughout a model integration, rather than at only the initial time, can successfully limit large-scale model error growth (amplitude and phase errors) while the model maintains intervariable consistency and generates realistic mesoscale structures not resolved by the data. The purpose of the paper is to further refine the previously reported FDDA strategy used to produce 'dynamic analyses' of the atmosphere by investiating the effects of data assimilation within the planetary boundary layer (PBL). The data used for assimilation include conventional synoptic-scale rawinsonde data and mesoalpha-scale surface data. The main objective of the study is to determine how to effectively utilize the combined strength of these two simple data systems while avoiding their individual weaknesses. Ten experiments, which use a 15-layer version of the model, are evaluated for two midlatitude, real-data cases. (Copyright (c) 1991 American Meteorological Society.)

Keywords: *Mesoscale phenomena, *Mathematical models, *Atmospheric boundary layer, *Air flow, Four-dimensional calculations, Assimilation, Atmospheric temperature, Wind(Meteorology), Precipitation(Meteorology), Rawinsondes, Reprints.

PB92-153931/REB PC **A03/MF A01**
Bioavailability to Plants of Sludge-Borne Toxic Organics. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
G. A. O'Connor, R. L. Chaney, and J. A. Ryan. c1992, 29p EPA/600/J-92/101
Pub. in Jnl. of Reviews of Environmental Contamination and Toxicology, v121 p129-155. See also PB86-150208 and PB91-177287. Prepared in cooperation with Agricultural Research Service, Beltsville, MD., and New Mexico State Univ., Las Cruces. Dept. of Agronomy and Horticulture.

Large numbers of man-made organic chemicals occur in sewage sludge and many are thought to represent an environmental hazard. This is particularly true of the compounds classified as priority pollutants (TOs) which typically occur in sludges in the mg/kg concentration range. Concerns about their environmental fate, specifically their bioavailability to food-chain crops, have disrupted land application of sludges. A review of the pertinent literature (especially field studies utilizing sludge-amended soils and confirmational analysis for parent compound) suggest the concern is largely groundless. The vast majority of TOs in sludge occur at low concentrations and when applied to soil are strongly sorbed in the soil-sludge matrix, degraded, or are otherwise lost from the soil during the cropping season. Plant bioconcentration factors for most TOs are less 0.01 DW. Even if taken up by plants the TOs may be metabolized within the plant or accumulate in plant parts that are usually not consumed. In contrast a second general group of man-made organics (aromatic surfactants) exist in sludge at much greater concentrations (g/kg).

Keywords: *Plants(Botany), *Biological availability, *Sewage sludge, *Organic compounds, *Toxic substances, Food chains, Farm crops, Field tests, Surfactants, Polychlorobiphenyl compounds, Pesticides, Hydrocarbons, Aromatic polycyclic hydrocarbons, Reprints, *Priority pollutants, Volatile organic compounds.

PB92-153949/REB PC **A03/MF A01**
Reclaiming Fiber from Newsprint Dry Methods. Journal article.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
D. E. Gunderson, C. T. Scott, R. L. Geisner, and T. M. Harten. c1992, 17p EPA/600/J-92/102
Pub. in Jnl. of Hazardous Materials, v29 n2 p297-311 Jan 92. Prepared in cooperation with Forest Products Lab., Madison, WI.

In the study the authors examine the fiber preparation processes with the objective of demonstrating that dry-disintegration is feasible and capable of yielding a useful fiber. The project is linked with research directed toward dry and semi-dry forming methods. The fiber product is rated on the basis of yield, fiber length, and the formation, strength, brightness and opacity of a paper specimen formed by standard wet-process methods. At 18% moisture content, crumbs of dewatered pulp have been processed in disk refiner to yield fibers suitable for air forming. In the 'best effort to date' fiber length (weighted) was 1.20 mm, not significantly different from the wet-slushed control at 1.26 mm. Other methods and moisture values yielded lengths as short as 0.88 mm. Tensile index and tear for handsheets from the furnished were 16.2 Nm/g and 139 mN; well below 27.0 Nm/g and 273 mN for the control. Press drying doubles the performance of the wetlaid sheets, however, causing even the dry fiberized furnish to approach virgin newsprint strengths. Performance of early air-formed sheets was 50-60% that of water-laid, press-dried sheets. Results to date show

that dewatered crumbs of ONP can be fiberized with good yield at moisture contents in the range from 6% to nearly 60%. Damage to the fiber is greatest at lower moisture content and decreases as moisture level is elevated.

Keywords: *Newsprint, *Waste papers, *Waste recycling, *Fibers, Paper industry, Dry methods, Dewatering, Moisture content, Feasibility studies, Materials recovery, Design criteria, Waste management, Pulping, Paper products, Reprints, Deinking.

PB92-154277 Not available NTIS
Department of Energy, Washington, DC.
Thermophysical Properties of Gaseous Refrigerants from Speed-of-Sound Measurements. 2. Results for 1,1-dichloro-1-fluoroethane (CCl2FCH3). Final rept.
National Inst. of Standards and Technology (NML), Gaithersburg, MD. Thermophysics Div.
A. R. H. Goodwin, and M. R. Moldover. 1991, 6p
See also Part 3, PB92-144633. Sponsored by Department of Energy, Washington, DC., and Environmental Protection Agency, Washington, DC.
Pub. in Jnl. of Chemical Physics 95, n7 p5230-5235, 1 Oct 91.

The speed of sound in gaseous 1,1-dichloro-1-fluoroethane (CCl2FCH3, commonly known as R141b) has been measured between 260 and 315 K. Perfect-gas heat capacities and second acoustic virial coefficients have been calculated from the results. The second acoustic virial coefficients are used to estimate the density virial coefficients B(T) and an effective square-well potential. The estimates of B(T) are consistent with B(T) deduced from high-quality p(V(m), T) results. Estimates are given for the vibrational relaxation time for R141b.

Keywords: *Refrigerants, Acoustic velocity, Virial coefficients, Specific heat, Thermophysical properties, Reprints, *Ethane/dichloro-fluoro.

PB92-154806/REB PC A03/MF A01
Pesticide Reregistration Handbook: How to Respond to the Reregistration Eligibility Document.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Oct 91, 34p EPA/540/09-92/180

The Handbook provides instructions to registrants on how to respond to the Reregistration Eligibility Document (hereafter referred to as the RED) and how to reregister products. Section I is the introduction; Section II contains step-by-step instructions which must be followed by registrants responding to the RED; Section III provides additional instructions on the format, content and other aspects of generic data, product specific data and labels/labeling which may be required to be submitted.

Keywords: *Pesticides, *Guidelines, Labels, Packaging, Hazardous materials, Agricultural products, Toxicity, *Reregistration, Federal Insecticide Fungicide and Rodenticide Act, Product chemistry.

PB92-155696/REB PC A03/MF A01
Nitrate Occurence in U.S. Waters (and Related Questions). A Reference Summary of Published Sources from an Agricultural Perspective.
Department of Agriculture, Washington, DC.
J. Fedkiw. Sep 91, 41p
Prepared in cooperation with Environmental Protection Agency, Washington, DC., Geological Survey, Reston, VA., Tennessee Valley Authority, Chattanooga, and National Oceanic and Atmospheric Administration, Rockville, MD.

The development of the reference summary of published information on nitrate occurrence in U.S. waters and related questions was undertaken in 1990 by the USDA Working Group on Water Quality. The summary is meant to provide the U.S. Department of Agriculture (USDA) a broad perspective on the proportions of the problem of ground and surface water and estuary contamination associated with nitrate from agricultural sources. The formal assessment of water quality conditions is primarily the role of the U.S. Geological Survey and the U.S. Environmental Protection Agency at the Federal level and primarily on the States at the local level.

Keywords: *Agriculture, *Nitrates, *Water pollution, *States(United States), Surveys, Ground water, Concentration(Composition), Water wells, Surface waters, Estuaries, Seasonal variations, Estimates, Aquifers, Fertilizers, Sampling, Runoff, Humans, Exposure, Tables(Data), Livestock.

PB92-158260/REB PC A06/MF A02
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Summary of NOx Control Technologies and Their Availability and Extent of Application. Technical rept.
Midwest Research Inst., Cary, NC.
Feb 92, 105p
Contract EPA-68-D1-0115
See also PB84-118330 and PB91-217364. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.

The Technical Report is a summary of previous documents dealing with NOx control technologies. It provides a brief description of existing NOx control technologies. The report also discusses the availability and extent of application of these technologies for several industrial categories that are the main stationary sources of NOx emissions. Where available, achievable controlled NOx emission levels and percent reduction for each control technology are presented.

Keywords: *Air pollution control, *Nitrogen oxides, *Air pollution abatement, Pollution sources, Stationary sources, Fuel substitutes, Catalysis, Incinerators, Boilers, Industrial wastes, Exhaust emissions, Revisions, Absorption, Combustion products, Flue gases, Catalytic reactors(Exhaust systems), Chemical industry, Space heating.

PB92-158450/REB PC A14/MF A03
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Exposure and Release Estimations for Filter Press and Tray Dryer Operations Based on Pilot Plant Data. Final rept.
Southwest Research Inst., San Antonio, TX.
M. C. Marshall, and H. K. Howard. 20 Mar 92, 320p
EPA/600/R-92/039
Grant EPA-R-813355
See also PB90-119587. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Worker exposures and chemical releases associated with a plate-and-frame filter press and a stationary tray dryer were studied in a pilot plant. The equipment was representative of those in a chemical manufacturing plant; the filter press was previously used at a chemical plant, and the dryer trays were the same size used by dye manufacturers. A randomized series of eight experiments identified the most influential variables for inhalation exposure during the tray drying unit operation which used approximately 100 kg of CaCO3. The range of conditions studied in the eight experiments provide inhalation exposure data for evaluating the impact of physical properties, the activities performed, and the influence of worker technique.

Keywords: *Copper, *Waste treatment, *Industrial medicine, Filter presses, Drying apparatus, Personnel, Exposure, Inhalation, Particle size, Calcium carbonates, Pilot plants, Monitoring, Occupational safety and health.

PB92-158468/REB PC A04/MF A01
Indoor Air Quality Data Base for Organic Compounds. Final rept. Jan-Nov 91.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
M. M. Samfield. Feb 92, 74p EPA/600/R-92/025
See also PB83-231357, PB88-100060 and PB88-195631.

The report gives results of the compilation of a data base for concentrations of organic compounds measured indoors. Based on a review of the literature from 1979 through 1990, the data base contains information on over 220 compounds ranging in molecular weight from 30 to 446. The compounds are arranged in order of increasing number of carbon atoms, from 1 to 31. The data base contains the number of carbon atoms; the name of the compound; its empirical formula; its molecular weight; the odor threshold (when available); the minimum, maximum, median, and mean concentrations; the standard deviation; the reference number; the sampling time; and the type of building. All concentration data are given in micrograms per cubic meter. The following compounds were the most frequently reported: formaldehyde, tetrachloroethylene, 1,1,1-trichloroethane, trichloroethylene, benzene, p-dichlorobenzene, toluene, ethylbenzene, xylenes, decane, and undecane. About 50% of the reported compounds contained 9 carbon atoms or fewer, and 90% had 23 carbon atoms or fewer. Sampling times for the pollutants varied from as little as 15 minutes to as long as 2 weeks. Grab sampling, real time sampling, and integrated sampling methods were used. Odor thresholds for the reported pollutants were, in general, three to five orders of magnitude higher than those measured.

Keywords: *Indoor air pollution, *Air quality, *Organic compounds, *Air pollution sampling, Data bases, Concentration(Composition), Chemical properties, Buildings, Odors, Tables(Data).

PB92-158476/REB PC A03/MF A01
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Asbestos Concentrations Two Years After Abatement in Seventeen Schools. Final summary rept.
IT Environmental Programs, Inc., Cincinnati, OH.
J. R. Kominsky, R. W. Freyberg, J. A. Brownlee, and D. R. Gerber. Mar 92, 41p EPA/600/R-92/027
Contract EPA-68-CO-0016
See also PB87-110961, PB89-133449 and PB91-217398. Prepared in cooperation with New Jersey State Dept. of Health, Trenton. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

Airborne asbestos concentrations were measured at 17 schools that underwent an asbestos abatement 2 years before in 1988. These 17 schools, which involved 20 abatement sites, were part of a study conducted by the U.S. Environmental Protection Agency (EPA) and the New Jersey Department of Health (NJDOH) in 1988. The 1988 study showed that asbestos concentrations measured independently by the NJDOH and EPA during the clearance phase of the abatement were elevated in the abatement and perimeter areas compared with outdoor concentrations. The present study was conducted to determine the current levels of airborne asbestos under simulated occupancy conditions and to determine whether the elevated levels found during the clearance phase were still present 2 years after abatement. In 1990, four sites showed significantly higher mean asbestos concentrations inside the building (i.e., the previously abated area and/or perimeter area) compared with those outdoors ($p<0.05$). In 1990, the mean asbestos concentration measured in the perimeter area at one site and in the previously abated area at two sites were significantly higher than those in 1988 ($p<0.05$). Variations in asbestos levels between 1988 and 1990 may be due to sampling techniques (passive and aggressive versus modified aggressive), residual air-entrainable asbestos from the 1988 abatement, or air-entrainable asbestos from operations and maintenance activities since 1988.

Keywords: *Asbestos, *Air pollution abatement, *School buildings, *Indoor air pollution, Concentration(Composition), Air pollution sampling, Statistical analysis, Quality assurance, Comparison, Recommendations, Tables(Data), Asbestos Hazard Emergency Response Act.

PB92-158484/REB PC A02/MF A01
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Observations of Transport of Trace Gases by Vigorous Convective Clouds. Conference paper 12 Jun 89-30 Sep 90.
North Dakota Univ., Grand Forks.
A. Alkezweeny, J. Stith, and J. K. S. Ching. 1992, 6p
EPA/600/A-92/054
Grant EPA-R-816010-01
Presented at the Joint Conference on Applications of Air Pollution Meteorology with AWMA (7th), New Orleans, LA., January 13-18, 1991. See also PB86-144623. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Cumulus convective clouds provide an important link between the mixed layer and the upper levels of the troposphere. Fresh boundary layer pollutants emitted naturally and anthropogenically can be transported to high altitudes during deep convective activity. The convective transport process is complex and poorly understood at present. One of the objectives of the North Dakota Thunderstorm Project, a joint field measurement program conducted near Bismarck North Dakota during June and July 1989 (Boe et al. 1989), was to document vertical transport by cumulonimbus type clouds. A tracer, SF(sub 6), was used to follow the movement of air from cloud base to higher elevations. The case study described in the paper is from a developing, vigorous cumulus cloud that was a part of a larger Mesoscale Convective System. Data used here includes observations from the NCAR CP3 Doppler radar and from the University of Wyoming King air research aircraft.

Keywords: *Environmental transport, *Cumulus clouds, *Air pollution, Troposphere, Boundary layers, Convection, Thunderstorms, Tracer studies, Stratosphere, Penetration, Concentration(Composition), Ozone, Clouds(Meteorology), Doppler radar, Measurement, Tables(Data), Graphs(Charts), North Dakota Storm Project.

PB92-158492/REB PC **A02**/MF **A01**
Environmental Protection Agency
Evaluation of RADM Predictions for a Mesoscale-beta Box Volume over Northeastern Pennsylvania. Conference paper Aug 88-Sep 90.
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Garmisch-Partenkirchen (Germany, F.R.). Inst. fuer Atmosphaerische Umweltforschung.
E. Schaller, J. S. Chang, J. Boatman, J. K. S. Ching, and M. Meyer-Wyk. 1990, 6p EPA/600/A-92/055
Contract EPA-68-02-4548
See also N90-19684. Prepared in cooperation with State Univ. of New York at Albany. Atmospheric Sciences Research Center, National Oceanic and Atmospheric Administration, Boulder, CO. Air Resources Lab., and Battelle Columbus Div., OH. Environmental Services Div. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Eulerian Acid Deposition Models like RADM (Regional Acid Deposition Model, Chang et al., 1987) need validation in order to investigate their aptitude for emission control strategies. For that purpose simultaneous measurements of atmospheric parameters using multiple aircraft are most suitable. In August and September 1988 an experiment was carried out over the Eastern part of the United States using three planes (NOAA King Air, Battelle Gulf Stream and Fraunhofer Hawker Siddeley). Three specific flight patterns were designed in order to get input and validation data for the investigation of the model performance under different weather conditions.

Keywords: *Acid rain, *Air pollution, *Atmospheric models, *Air pollution monitoring, Aerial surveys, Ozone, Sulfur dioxide, Nitrogen oxides, Hydrogen peroxide, Mathematical models, *Eastern Region(United States), Regional Acid Deposition Model.

PB92-158500/REB PC **A02**/MF **A01**
Performances of Lagrangian and Eulerian Transport and Diffusion Models across Continental Scales. Conference paper 1989-90.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
T. L. Clark, and R. D. Cohn. Jan 91, 6p EPA/600/A-92/056
See also PB89-198253, PB89-156137, and PB90-261454. Presented at Joint Conference on Applications of Air Pollution with AWMA (7th), New Orleans, LA., January 14-18, 1991. Prepared in cooperation with Analytical Sciences, Inc., Durham, NC.

During the first three months of 1987, two chemically-inert perfluorocarbon tracer gases were released near ground level every 2.5-days from two sites in central North America and sampled for 24-hour periods at 77 surface sites across central and eastern North America. The source-receptor distances ranged from less than 30 km to 3000 km. These Across North America Tracer Experiment (ANATEX) data from the 66, 3-h releases serve as a unique evaluation data set with which to evaluate the long-range transport and diffusion simulations of regional atmospheric models and to establish a range of uncertainty for various model genres.

Keywords: *Air pollution, *Atmospheric models, *Pollution transport, *Atmospheric diffusion, *North America, Tracer studies, Mathematical models, Environment simulation, *Across North America Tracer Experiment, Perfluorocarbon tracers.

PB92-158518/REB PC **A03**/MF **A01**
AcidMODES: A Major Field Study to Evaluate Regional Scale Air Pollution Models. Conference paper Jun 88-Apr 91.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
J. K. S. Ching, and N. E. Bowne. c1992, 13p EPA/600/A-92/057
Prepared in cooperation with National Oceanic and Atmospheric Administration, Research Triangle Park, NC. Atmospheric Sciences Modeling Div., and ENSR, Glastonbury, CT.

Regional scale, Eulerian framework air quality simulation models are currently being evaluated using pollutant and meteorological measurements from special surface networks and airborne platforms. An evaluation protocol for such models using this data base has been developed and adopted by the National Acid Precipitation Assessment Program; it includes 'Operational' and 'Diagnostic' components. The paper focuses on the diagnostic evaluation of the Regional Acid Deposition Model (RADM), using aircraft measurements from the Acid Model Operational Diagnostic Evaluation Study (AcidMODES) program under sponsorship of the United States Environmental Protection Agency (USEPA). RADM's ability to resolve horizontal patterns and gradients as well as the vertical structure of primary and secondary acidic pollutant species in the mixed layer over the major source region for sulfur and nitrogen emissions is an essential diagnostic test and is demonstrated. The potential roles of remote sensing in the evaluation of the regional models are suggested.

Keywords: *Regional analysis, *Mathematical models, *Air pollution, Aerial surveys, Horizontal orientation, Vertical orientation, Remote sensing, Acidification, Deposition, Air quality, *Regional Acid Deposition Model, *Acid Model Operational Diagnostic Evaluation Study Program, Source-receptor relationships, Eulerian models.

PB92-158526/REB PC **A02**/MF **A01**
Effect of Sub-Grid-Scale Rainfall Analysis on Sulfate Wet Deposition Estimates in the Regional Lagrangian Model of Air Pollution (RELMAP).
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
O. R. Bullock. 1992, 6p EPA/600/A-92/058
See also PB86-171394 and PB88-190509.

A method for the sub-grid-scale analysis of observed hourly rainfall data has been developed to estimate wet deposition quantities of sulfur in the Regional Lagrangian Model of Air Pollution (RELMAP). The method was developed with the constraint that the data array structure of the RELMAP not be significantly expanded in order that the Model could continue to be run on less powerful computing systems.

Keywords: *Air pollution, *Rainfall, *Sulfates, *Deposition, Precipitation(Meteorology), Sulfur oxides, Estimates, *Regional Lagrangian Model of Air Pollution, Wet methods.

PB92-158534/REB PC **A03**/MF **A01**
Use of Perifusion to Evaluate Hormonal Release In vitro from Rat Pituitary and Hypothalamic Tissue.
Health Effects Research Lab., Research Triangle Park, NC. Reproductive Toxicology Branch.
J. M. Goldman, and R. L. Cooper. 1992, 33p EPA/600/A-92/059
Pub. in Methods in Reproductive Toxicology.

The use of in vitro procedures in reproductive toxicology has permitted a direct assessment of hormonal release from isolated tissue and a means by which to determine potential sites of toxicant insult. The present chapter describes a perifusion procedure that can be used to evaluate stimulated or baseline hormonal secretion from pituitary and brain hypothalamic tissue. The implementation and utility of various combinations of tissue stimulation are presented, along with a discussion of the relative advantages and limitations of perifusion as an experimental approach.

Keywords: *Pituitary hormones, *Hypothalamic hormones, *Physiology, Toxicity, Tissues(Biology), Drawings, In vitro analysis, Culture media, Gonadorelin, Laboratory animals, Laboratory equipment, *Perifusion.

PB92-158559/REB PC **A03**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Non-Stormwater Discharges into Storm Drainage Systems.
Alabama Univ. in Birmingham. Dept. of Civil Engineering.
R. E. Pitt, and R. Field. 1992, 14p EPA/600/A-92/061
Contract EPA-68-C9-0033
Pub. in Specialty Conference Proceedings of Control of Combined Sewer Overflows, Bostian, MA., April 8-11, 1990. See also PB85-186500. Sponsored by Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The paper summarizes the first phase of an EPA sponsored research project to develop a manual-of-practice to investigate non-stormwater discharges of polluted waters into storm drainage systems. A number of past projects have found that dry-weather flows discharging from storm drainage systems can contribute significant pollutant loadings to receiving waters. If these loadings are ignored (by only considering wet-weather stormwater runoff, for example), little improvement in receiving water conditions may occur with many stormwater control programs. These dry-weather flows may originate from many sources, the most important sources may include sanitary sewage or industrial and commercial discharge cross-connections, failing septic tank systems in storm sewered areas, and vehicle maintenance activities. After the outfalls are identified that are affected by polluted dry-weather flows, additional survey activities are needed to locate and correct their sources.

Keywords: *Runoff, *Water pollution control, *Storm sewers, Urban areas, Streets, Drainage, Combined sewers, Overflows, Droughts, Hydrology, Catch basins, Sewage, Industrial wastes, Septic tanks, Surface runoff, Urban hydrology.

PB92-158567/REB PC **A02**/MF **A01**
Handling and Disposal of Sludges and Residuals from Combined Sewer Overflow Treatment.
Municipal Environmental Research Lab.-Cincinnati, Edison, NJ. Storm and Combined Sewer Section.
R. Field, Y. Iwasa, and T. Sueishi. 1990, 8p EPA/600/A-92/062
Proceedings of the International Conference on Urban Storm Drainage (5th), Osaka, Japan, July 23-27, 1990, v2 p1117-1124. See also PB-214 469, PB-280 309, PB-281 006 and PB92-158575.

The paper summarizes the results of a three phases US EPA project to define the problems and establish treatment procedures for handling and disposal of residual sludges and solids from combined sewer overflow treatment.

Keywords: *Sludge disposal, *Sewage sludges, *Combined sewers, *Materials handling, *Overflows, Dewatering, Waste treatment, Physical/chemical treatment, Heavy metals, Urban areas, Soil treatment, Stabilization, Calcium oxides, Waste utilization, Reprints.

PB92-158575/REB PC **A02**/MF **A01**
Demonstration of In-Receiving Water Storage of Combined Sewer Overflows: In a Marine/Estuarine Environment by the Flow Balance Method.
Municipal Environmental Research Lab.-Cincinnati, Edison, NJ. Storm and Combined Sewer Section.
R. Field, K. Dunkers, and A. Forndran. 1990, 8p EPA/600/A-92/063
Proceedings of the International Conference on Urban Storm Drainage (5th), Osaka, Japan, July 23-27, 1990, v2 p759-764. See also PB92-158567. Prepared in cooperation with Dunkers (Karl) Engineering Corp., Taby (Sweden), and New York City Dept. of Environmental Protection, Wards Island.

The paper describes the USEPA's demonstration project for storing combined sewer overflow in a salt-receiving water body by the flow balance method (FBM). The FBM facilities contain urban-storm-induced discharges between flexible plastic curtains suspended from floating wooden pontoons making them relatively inexpensive.

Keywords: *Water storage, *Combined sewers, *Overflows, *Water pollution control, Marine environment, Estuaries, Storm water drainage, Storm sewers, Urban areas, Hydrology, Reprints, *Flow balance method, *Water curtains.

PB92-158583/REB PC A03/MF A01
Compound-Induced Alterations of Sexual Differentiation: A Review of Effects in Humans and Rodents. Book chapter.
Health Effects Research Lab., Research Triangle Park, NC. Reproductive Toxicology Branch.
L. E. Gray. 1992, 50p EPA/600/A-92/064
Pub. in Chemically Induced Alterations in Sexual Development: The Wildlife Human/Connection. See also PB86-107206 and PB89-237481.

During sexual differentiation there are a number of critical periods when the reproductive system is uniquely susceptible to chemically-induced perturbations. At these times an inappropriate chemical signal can result in irreversible lesions that often result in infertility, whereas similarly exposed young adults are only transiently affected. The serious reproductive abnormalities that resulted from human fetal exposure to DES, synthetic hormones and other drugs provide grim examples of the types of lesions that can be produced by interfering with this process. Furthermore, it is of concern that many of the abnormalities are not expressed during fetal and neonatal life and only become apparent after puberty. The present discussion selectively reviews a wide range of chemically-induced abnormalities of the sexual differentiation in mammals. The list of known developmental reproductive toxicants includes a broad spectrum of drugs, pesticides and toxic substances. Some of the xenobiotics, like the PCBs and dioxin, are of particular concern because they persist in the environment and bioaccumulate in the food chain.

Keywords: *Toxic substances, *Sex differentiation, *Species diversity, Humans, Rodents, Teratogens, Hormones, Drugs, Pesticides, Fetus, Animal disease models, Food chains, Males, Females, Central nervous system, Enzyme inhibitors.

PB92-158591/REB PC A01/MF A01
Environmental Monitoring Systems Lab., Las Vegas, NV.
Evaluation of Four Aerobiological Sampling Methods for the Retrieval of Aerosolized 'Pseudomonas syringae'. Journal article.
Nevada Univ., Las Vegas. Environmental Research Center.
M. P. Buttner, and L. D. Stetzenbach. c1991, 5p EPA/600/J-92/103
Grant EPA-R-817495-01-0
Pub. in Applied and Environmental Microbiology, v57 n4 p1268-1270 1991. Sponsored by Environmental Monitoring Systems Lab., Las Vegas, NV.

The Andersen six-stage impactor, the SAS (Surface Air System) impactor, the AGI-30 impinger, and gravity plates were evaluated for the retrieval of aerosol-released Pseudomonas syringae. The upper limits of the impactor samplers were exceeded at a spray concentration of 10 to the 7th power CFU/ml, indicating that these samplers are not appropriate for monitoring high airborne concentrations. Decreased cell concentrations were retrieved with increased sampling time for the Andersen and AGI samplers, indicating that a minimum sampling time is preferable for monitoring aerosolized vegetative cells. (Copyright (c) 1991, American Society for Microbiology.)

Keywords: *Aerobiology, *Air samplers, Microbial colony count, Bacillus subtilis, Comparisons, Farm crops, Greenhouses, Reprints, *Pseudomonas syringae.

PB92-158617/REB PC A03/MF A01
Health Effects Research Lab., Research Triangle Park, NC.
Retinoic Acid Alters Epithelial Differentiation during Palaotogenesis. Journal article.
National Inst. of Environmental Health Sciences, Research Triangle Park, NC.
B. D. Abbott, and R. M. Pratt. c1991, 12p EPA/600/J-92/105
Pub. in Jnl. of Craniofacial Genetics and Developmental Biology 11, n4 p315-325 Nov 91. Sponsored by Health Effects Research Lab., Research Triangle Park, NC.

Retinoids are teratogenic in humans and animals, producing a syndrome of craniofacial malformations that includes cleft palate. A study investigates the mechanism through which retinoic acid induces cleft palate. Murine palatogenesis after exposure to retinoic acid in utero is compared to normal development and to alterations observed after exposure in organ culture to retinoic acid or epidermal growth factor (EGF). Human embryonic palatal shelves were placed in the organ culture system and the responses to retinoic acid and EGF were compared to those of the murine palatal shelves. Growth factors play a role in normal development and are found in the embryonic palate. In other cell culture systems, retinoids alter the expression of EGF receptors. Study results suggest that in the medial epithelial cells of the palate, retinoic acid sustains the expression of the EGF receptor and the binding of EGF at a time when the expression in control medial cells has declined, and these control cells subsequently undergo programmed cell death. (Copyright (c) 1991 MUNKSGAARD.)

Keywords: *Tretinoin, *Cell differentiation, *Cleft palate, *Teratogenic compounds, Epidermal growth factor-urogastrone, Deoxyribonucleic acids, Mice, Isotretinoin, Cell division, Cell survival, Phenotype, Immunohistochemistry, Reprints.

PB92-158625/REB PC A02/MF A01
Lotus 1-2-3-Based System for Recording and Maintaining Body Weight of Laboratory Animals. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
J. S. Ali, V. B. Olszyk, D. D. Dunn, K. L. A. Lee, and S. M. Kendall. c1992, 9p EPA/600/J-92/106
Pub. in Behavior Research Methods, Instruments and Computers 24, n1 p82-87 Feb 92. Prepared in cooperation with ManTech Environmental Technology, Inc., Research Triangle Park, NC.

Body weight maintenance is required in a variety of behavioral and physiological studies. A PC-based animal weighing system is described which features automated data collection and allows for accurate control of body weight in test animals via manipulation of food intake. Major system components are a PC-XT compatible computer, LOTUS 1-2-3 and measure software, and a digital electronic balance. The system is controlled by LOTUS macros which present menus to the user. Menus provide for the basic operations of the system, including establishing new data files, collecting weight data, printing, and transferring files to a laboratory minicomputer. The optional weight maintenance algorithm calculates the amount of food necessary to maintain target body weights. Some important aspects of this algorithm, including maintanance feeding and gain parameters, can be manipulated to reduce weight oscillation in test animals, or to accommodate the maintenance of body weight of different animal species. The system facilitates acquisition and recording of weight data, minimizes the frequency of error, and reduces variability both within and across animals when body weight maintenance is required.

Keywords: *Laboratory animals, *Body weight, Species diversity, Computer applications, Algorithms, Weight gain, Food consumption, Weight indicators, *Lotus 1-2-3 system.

PB92-158633/REB PC A03/MF A01
Neurobiological Effects of Colchicine: Modulation by Nerve Growth Factor. Journal article.
Environmental Protection Agency, Research Triangle Park, NC. Neurotoxicology Div.
S. Barone, M. Bonner, P. Tandon, J. F. McGinty, and H. A. Tilson. c1992, 12p EPA/600/J-92/107
Pub. in Brain Research Bulletin, v28 n2 p265-274 Feb 92. See also PB92-150770. Prepared in cooperation with East Carolina Univ. School of Medicine, Greenville, NC.

To study the effects of exogenously applied nerve growth factor (NGF) on colchicine-induced neurodegeneration in the dentate gyrus of the rat hippocampal formation, colchicine (COLCH) or artificial cerebrospinal fluid (ACSF) was infused into the dorsal hippocampus (HPC) followed by unilateral infusion of either purified beta-NGF (in ACSF) or cytochrome C. One week later, animals were tested in activity chambers when NGF treatment was found to reduce the COLCH-induced hyperactivity. Animals were sacrificed 3 or 12 weeks postlesion for neurochemical or morphological analysis. Carbachol-stimulated phosphatidyl inositol (PI) turnover performed in hippocampal slices was not affected by any treatment at 3 weeks. However, 12 weeks after the lesion, CARB stimulation of PI hydrolysis was increased in the COLCH/ACSF group. NGF treatment significantly reduced the hyperstimulation in COLCH-treated rats. Morphological analysis showed that COLCH treatment increased AChE staining in the hippocampus, whereas NGF treatment had no effect on AChE staining. There was no difference in the number of septal ChAT immunoreactive cell bodies of controls or colchicine-treated rats at either time point examined. However, NGF treatment resulted in a significant increase in the number of ChAT immunoreactive cell bodies 3 weeks postlesion. Results from the study indicate that NGF can modify colchicine-induced compensatory changes in hippocampal signal transduction and has transitory influences on cholinergic cells in the medial septum.

Keywords: *Colchicine, *Nerve growth factor, *Nervous system, *Pharmacology, Rats, Hippocampus, Carbachol, Locomotion, Signal transduction, Phosphatidylinositols, Cell differentiation, Cytochrome C, Acetylcholinesterase, Animal behavior, Immunohistrochemistry, Corpus striatum, Reprints.

PB92-158641/REB PC A03/MF A01
Comparisons of the Effects of TCDD and Hydrocortisone on Growth Factor Expression Provide Insight into Their Interaction in the Embryonic Mouse Palate. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
B. D. Abbott, M. W. Harris, and L. S. Birnbaum. c1992, 21p EPA/600/J-92/108
Pub. in Teratology 45, n1 p35-53 Jan 92. Prepared in cooperation with National Inst. of Environmental Health Sciences, Research Triangle Park, NC.

Cleft palate (CP) can be induced in embryonic mice by a wide range of compounds, including glucocorticoids and 2,3,7,8-tyetrachlorodibenzo-p-dioxin (TCDD). Hydrocortisone (HC), a glucocorticoid, retards embryonic growth producing small palatal shelves, while TCDD exposure blocks the fusion of normally sized shelves. TCDD induction of CP involves altered differentiation of the medial epithelial cells. Recent studies indicate that growth factors such as EGF, TGF-alpha, TGF-beta1, and TGF-beta2 are involved in palatogenesis, regulating proliferation, differentiation, and extracellular matrix production. A synergism has been observed between HC and TCDD in which doses too low to induce CP alone are able to produce >90% incidence when coadministered. In the present study a standard teratology protocol was performed in C57BL/6N mice to examine the synergism at doses lower than those previously published. Data from the study indicate synergistic interactions at doses as low as 3 micrograms TCDD/kg + 1 mg HC/kg. This extreme sensitivity suggests the involvement of a receptor-mediated mechanism possibly resulting in altered regulation of gene expression. (Copyright (c) 1992 Wiley-Liss, Inc.)

Keywords: *Toxicity, *Tetrachlorodibenzodioxin, *Hydrocortisone, *Cleft palate, *Teratogens, *Transforming growth factors, *Epidermal growth factor-urogastrone, Mice, Embryos, Messenger RNA, Gene expression regulation, Immunohistochemistry, Epithelium, Electron microscopy, Nucleic acid hybridization, Reprints.

PB92-158658/REB PC A02/MF A01
Relationship between Cholinesterase Inhibition and Thermoregulation Following Exposure to Diisopropyl Fluorophosphate in the Rat. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
C. J. Gordon, L. Fogelson, J. Richards, and J. Highfill. c1991, 10p EPA/600/J-92/109

Pub. in Toxicology Letters, v59 p161-168 Dec 91. See also PB92-124668. Prepared in cooperation with NSI Technology Services Corp., Research Triangle Park, NC.

The study examined the relationship between inhibition of cholinesterase activity (CA) and thermoregulatory response in the rat following exposure to the organophosphate (OP), diisopropyl fluorophosphate (DFP). Male Long-Evans rats were injected with DFP dissolved in peanut oil in doses ranging from 0 to 1.5 mg/kg (s.c.). Colonic T(sub col) and tail skin temperature T(sub tail) were recorded at 0, 1, 2, and 3 hr post-injection. At 3 hr post-injection the rat was sacrificed and a blood sample was taken by cardiac puncture and analyzed for CA. There was a biphasic dose effect of DFP on T(sub col) with slight but significant elevation in T(sub col) in the dose range of 0.01 to 0.5 mg/kg and a significant depression in T(sub col) at doses of 1.0 and 1.5 mg/kg. There was a dose-dependent fall in CA with DFP administration in the erythrocyte, plasma, and whole blood fractions. Hypothermia was associated with 80 to 87% inhibition in CA, whereas the elevation in T(sub col) was associated with 20 to 70% inhibition in CA. DFP also elicited significant elevations in T(sub tail) (Copyright (c) 1991 Elsevier Science Publishers.)

Keywords: *Diisopropylfluorophosphate, *Body temperature regulation, *Cholinesterase inhibitors, *Toxicology, Rats, Exposure, Dose-response relationships, Acetylcholinesterase, Blood, Reprints.

PB92-158666/REB PC **A02/MF A01**
Intersubject Variability in Human Acute Ozone Responsiveness. Symposium Proceedings. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Clinical Research Branch.
W. F. McDonnell. c1991, 6p EPA/600/J-92/110
Pub. in Pharmacogenetics, v1 p110-113 Dec 91. See also PB84-101757, PB85-198323 and PB87-142949.

Individuals exposed to ozone experience a wide range in the magnitudes of lung function decrements and symptoms produced. These intersubject differences in response are reproducible over periods of time of at least one year, suggesting that responsiveness to ozone is a characteristic of the individual. The factors responsible for these differences are not currently known. Three strategies, including assessment of the role of heredity, for identifying these factors were proposed.

Keywords: *Air pollution effects(Humans), *Ozone, *Toxicity, *Lung, Respiratory function tests, Reproducibility of results, Genetics, Reprints, *Intersubject variability.

PB92-158674/REB PC **A03/MF A01**
Interspecies Sensitivity to Chemical Carcinogens: Relationships between Mouse Skin Tumors and Human Lung Cancer. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
S. Nesnow, and J. Lewtas. c1992, 33p EPA/600/J-92/111
Pub. in Jnl. of Environmental Science and Engineering, vC9 n2 p229-259 Dec 91. See also PB88-170089, PB89-224562 and PB90-132382.

The review focuses on the relationships between mouse skin tumors and human lung cancer and discusses these relationships from several perspectives. These perspectives include: mouse skin as an experimental test system; metabolic comparisons of the response of mouse skin and human lung; comparison of DNA binding in mouse skin and human lung tissues; patterns of oncogene mutations in mouse skin and human lung cancers; quantitative comparison of the tumorigenic effects of complex mixtures; use of similarity to apply the comparative potency approach to new mixtures. In general, in terms of tumorigenic response, both mouse skin and human lung respond to a number of the same chemicals. Metabolically, it seems that both tissues are capable of metabolizing some of the major classes of chemicals carcinogens PAH's, nitrosamines to products that can bind to DNA. DNA adducts from exposures to complex mixtures are detected in both mouse skin and human lung tissues. A variety of mutations are found in the Ha-ras oncogene from the DNA from mouse skin tumors induced by chemical carcinogens and human lung tumor DNA seems to have similar mutations in the family of ras genes.

Keywords: *Species specificity, *Skin neoplasms, *Pulmonary neoplasms, *Carcinogens, *Toxicity, *Environmental pollutants, Nitrosamines, Aromatic polycyclic hydrocarbons, DNA adducts, Mice, Humans, Mutation, Metabolism, Ras genes, Papilloma, Mutagens, Reprints.

PB92-158682/REB PC **A03/MF A01**
Deposition Patterns of Cigarette Smoke in Human Airways. Journal article.
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
T. B. Martonen. c1992, 14p EPA/600/J-92/112
Pub. in Jnl. of American Industrial Hygiene Association, v53 n1 p6-18 Jan 92. See also PB88-224282 and PB89-130454. Prepared in cooperation with North Carolina Univ. at Chapel Hill. Div. of Pulmonary Diseases.

Experimental deposition patterns of cigarette smoke in surrogate human airway systems are very heterogeneous. Particle deposits are enhanced at predictable, well-defined morphological regions; most specifically, carinal ridges within bifurcation zones and along posterior sections of tubular airways. The efficiency of the mucociliary transport mechanism in vivo is also reduced at airway branchings. The geometrical sites of preferential particle deposition and impaired clearance can be correlated with clinically observed anatomical sites exhibiting increased incidences of bronchogenic carcinomas. These locations are not compatible with current theoretical models simulating only the usual particle deposition processes of inertial impaction, sedimentation, and diffusion, while intending to account for particle hygroscopicity. Moreover, data from human subject exposures indicate that heretofore unknown factors affect the distribution of inhaled cigarette smoke. A new mathematical model is presented that explains cigarette smoke deposition patterns, including bifurcation 'hot spots,' in terms of composition and cumulative density. (Copyright (c) 1992, American Industrial Hygiene Association.)

Keywords: *Trachea, *Smoke, *Air pollution effects(Humans), *Tobacco, Mathematical models, Humans, Kinetics, Hygroscopicity, Respiratory function tests, Pulmonary neoplasms, Lung, Bronchial neoplasms, Reprints, *Particle deposition.

PB92-158690/REB PC **A02/MF A01**
Transport of Inorganic Colloids through Natural Aquifer Material: Implications for Contaminant Transport. Journal article.
Robert S. Kerr Environmental Research Lab., Ada, OK.
R. W. Puls, and R. M. Powell. c1991, 10p EPA/600/J-92/113
Pub. in Environmental Science and Technology, v26 n3 p614-621 1992. See also PB91-168419 and PB92-114503. Prepared in cooperation with ManTech Environmental Technology, Inc., Ada, OK.

The stability and transport of radiolabeled Fe2O3 particles were studied using laboratory batch and column techniques. Core material collected from a shallow sand and gravel aquifer was used as the immobile column matrix material. Variables in the study included flow rate, pH, ionic strength, electrolyte composition, particle concentration, and particle size. Transport was highly dependent upon colloidal stability. Iron oxide colloids were not only mobile to a significant extent, but under some hydrogeochemical conditions were transported faster than tritiated water, a conservative tracer. The extent of colloid breakthrough was dependent upon a variety of parameters; however, the highest statistical correlation was observed with particle size and anionic composition of the supporting electrolyte. Arsenate was utilized for assessment of colloid-contaminant and contaminant-aquifer interactions and comparison of dissolved and colloidally associated transport in dynamic model systems. The rate of colloid-associated arsenate transport was over 21 times that of the dissolved arsenate. (Copyright (c) 1992 American Chemical Society.)

Keywords: *Colloids, *Environmental transport, *Water pollution, *Aquifer characteristics, *Inorganic compounds, Permeability, Porous media, Ground water, Tracer studies, Stability, Hydrogeology, Electrolytes, Particle size, pH, Flow rate, Ions, Iron oxides, Reprints.

PB92-160084/REB PC **A04/MF A01**
Evaluation of the Fourier Transform Infrared Spectrometer for Particle-Associated Ammonium Sulfate Determination. Final rept.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
K. J. Krost. Mar 92, 69p EPA/600/R-92/050
See also PB86-157807 and PB88-213236.

A commercial Fourier transform infrared (FTIR) spectrometer, modified for automated analysis of particulate-associated sulfate, was used to obtain transmission spectra of samples of particulate matter collected from the ambient air onto Teflon filters. An evaluation of the instrumentation was undertaken to determine its applicability for measuring sulfate and the correlation of results with those of ion chromatography and x-ray fluorescence. Particle samples from six geographical areas were analyzed in the study. Results from different filter sets, using individual filter blanks, show values of the coefficient of determination of 0.90 or higher for any two techniques with one notable exception. The exception is due to displacement of sulfate absorption from the wavelength interval used for analysis, and apparently indicates the effect of co-collected compounds in chemically shifting the spectra. The detection limit is 1.2 microgram/sq cm which corresponds to 0.4 microgram/cu m sampled over 24 hours at 13.3 L/min for ammonium sulfate.

Keywords: *Ammonium sulfate, *Sulfates, *Particulates, *Infrared spectroscopy, *Air pollution monitoring, *Fourier transformation, Statistical analysis, Chemical analysis, *Fourier transform infrared spectroscopy.

PB92-160548/REB PC **A02/MF A01**
Pesticide Fact Sheet Number 232: Isoxaben.
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
16 Jun 89, 8p EPA/540/FS-92/188

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

Keywords: *Pesticides, *Toxic substances, Hazardous materials, Toxicology, Ecology, Mutagens, Teratogenic compounds, Laboratory animals, *Isoxaben, Chemical information fact sheet, Path of pollutants, Science findings, Use patterns, CAS 82558-50-7.

PB92-161033/REB PC **A04/MF A01**
Progress Report of the Baywide Nutrient Reduction Reevaluation: Chesapeake Bay Program.
Environmental Protection Agency, Annapolis, MD. Chesapeake Bay Program.
Feb 92, 69p

The ecological balances in the Bay are extremely complex and are affected by many factors. Nutrient enrichment is just one of the important factors contributing to imbalances in the Bay's delicate ecology. The purpose of this progress report is to give an overview of the problem caused by excess nutrients in the Bay, to explain the status of the ongoing Nutrient Reduction Reevaluation, and to report progress to date. Although this progress report's findings are preliminary, trends and generalizations of nutrient loads, water quality, and habitat improvements are becoming evident. Most of the background studies for the Nutrient Reduction Reevaluation have been drafted. To date, seven model runs have been completed for use in the report. Many additional computer model runs and refinements of the model will be necessary before results can be synthesized into final recommendations.

Keywords: *Chesapeake Bay, *Ecology, Water pollution, Water quality, Nutrients, Phosphorus, Nutrients, Maps, Oxygen, Project management, Aquatic plants, Salinity, Hydrodynamics, Baywide Nutrient Reduction Strategy.

PB92-161553/REB PC A12/MF A03
Multi-Media Investigation Manual.
National Enforcement Investigations Center, Denver, CO.
Mar 92, 266p EPA/330/9-89/003-R

The manual is intended as a guide for investigators who conduct multi-media compliance audits of facilities that discharge, emit, prepare, manage, store, or dispose of substances controlled by Federal, State or local environmental laws and regulations. Investigative methods are presented which integrate the enforcement programs associated with air, water, solid waste, pesticides and toxic substances. Investigators performing compliance audits follow established policies and procedures for: (1) chain of custody and document control; (2) handling of confidential information; (3) employee conduct; (4) quality assurance and quality control; (5) safety; (6) project planning and (7) report preparation.

Keywords: *Law(Jurisprudence), *Inspection, *Waste management, *Pollution control, Manuals, Facilities, Auditing, Compliance, Licenses, Statutes, Law enforcement, Quality assurance, Project planning, Government policies, National government, Local government, State government, Monitoring, Instructions, Multi-media investigations.

PB92-161918/REB PC A04/MF A01
Evaluation of Alternative Samplers for Bioaerosols. Phase 1. Physical Sampling Efficiency.
National Inst. for Occupational Safety and Health, Cincinnati, OH. Engineering Control Technology Branch.
K. F. Martinez, W. F. Todd, and T. J. Fischbach. 12 Mar 91, 54p CT-160-04A
See also PB92-136183. Prepared in cooperation with Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.

The sampling efficiencies of the Biotest centrifugal sampler, the SAS surface air sampler, the Andersen two stage sampler, and the Andersen single stage sampler with the membrane filter sampler were compared for use in assessing potential exposures to microorganisms in biotechnology based production facilities. Each sampler was challenged with a microbial surrogate aerosol under controlled conditions in a horizontal chamber designed for the study of aerosol samplers. The findings indicated that the Andersen two stage sampler differed from the other samplers except for the reference sampler, the filter cassette, in terms of the level of measurement on the average and by particle size level. The Andersen single stage sampler under sampled the reference sampler by -47%. The Biotest and the SAS sampler both under sampled the reference sampler by -81% and -57%, respectively. There was not a statistical difference among particle size ranges for the bias of the Biotest sampler. However, there was a statistical difference among particle size ranges for the bias of the SAS sampler.

Keywords: *Air samplers, *Biological aerosols, *Performance evaluation, Industrial hygiene, Particle size distribution, Biotechnology, Laboratory tests, Tracer studies, Air pollution monitoring, Air pollution control, Biotechnology industry.

PB92-161967/REB PC A04/MF A01
Enabling Document for New Source Performance Standards for Air Oxidation Processes and Distillation Operations in the Synthetic Organic Chemical Manufacturing Industry.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Jul 90, 69p EPA/450/3-90/018
See also PB90-247487.

The document provided specified guidelines for implementation of the New Source Performance Standards for Air Oxidation Processes and Distillation Operations.

Keywords: *Performance standards, *Oxidation, *Distillation, *Chemical industry, Regulations, Recommendations, Flow rate, Emission factors, Performance evaluation, *Volatile organic compounds, *Air pollution control.

PB92-164490/REB PC A05/MF A01
Environmental Research Lab., Athens, GA. Office of Research and Development.
Application of a Water Quality Assessment Modeling System at a Superfund Site.
AScI Corp., Athens, GA.
K. P. Brown, E. Z. Hosseinipour, J. L. Martin, and R. B. Ambrose. Aug 91, 94p EPA/600/3-91/046
Contract EPA-68-03-0355
See also PB88-144167 and PB88-185095. Sponsored by Environmental Research Lab., Athens, GA. Office of Research and Development.

Water quality modeling and related exposure assessments at a Superfund site, Silver Bow Creek-Clark Fork River in Montana, demonstrate the capability to predict the fate of mining waste pollutants in the environment. A linked assessment system -- consisting of hydrology and erosion, river hydraulics, surface water quality, metal speciation, non-point source and groundwater mixing and transport models -- has been applied at the site to show the applicability of such modeling schemes and the complexities involved in the application. Some of the models had to be modified to match the requirements of this project. Graphs of the water quality parameters show good fit between the measured and predicted concentrations at some stations whereas substantial deviations are observed at other stations along the course of the stream.

Keywords: *Mine wastes, *Hydrology, *Water quality, *Water pollution effects, *Superfund, *Mathematical models, Heavy metals, Clark Fork River, Montana, Silver Bow Creek, Water pollution control, Surface-groundwater relationships, Nonpoint sources, Erosion, Hydraulics, Computerized simulation.

PB92-164706/REB PC A03/MF A01
Environmental Radiation Data. Report 63, July-September 1990. Quarterly rept.
National Air and Radiation Environmental Lab., Montgomery, AL.
Mar 91, 44p EPA/520/5-91/025
See also PB91-206805.

Environmental Radiation Data (ERD) contains data from the Environmental Radiation Ambients Monitoring System (ERAMS). Data from similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in the ERD when available. The ERAMS is comprised of nationwide sampling stations that provide air, surface and drinking water and milk samples from which environmental radiation levels are derived. Sampling locations are selected to provide optimal population coverage while functioning to monitor fallout from nuclear devices and other forms of radioactive contamination of the environment. The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for fission products, and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton, and tritium.

Keywords: *Environmental monitoring, *Radiation monitoring, Water pollution sampling, Air pollution sampling, Potable water, Milk, Tables(Data), Radiation detection, Surface waters.

PB92-164714/REB PC A05/MF A02
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Drinking Water Systems: Three Approaches to Improve Mobile Home Park Compliance. Final rept.
National Rural Water Association, Washington, DC.
Jul 89, 100p EPA/570/9-89/009
See also PB91-129809. Sponsored by Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.

The highest priority of Federal and State drinking water programs is to assure the compliance of public water supplies (PWSs) with the National Primary Drinking Water Regulations (NPDWRs). The Environmental Protection Agency's (EPA) FY 1987 Compliance Report indicates that microbiological noncompliance is primarily a small systems problem. The purpose of this project is to document the effectiveness of three approaches to improving compliance of Mobile Home Parks' (MHP) water systems. The three approaches are: (1) information dissemination, (2) training and technical assistance, and (3) notification of possible liabilities due to noncompliance coupled with on-site technical assistance. By determining the effectiveness of these approaches, primacy agencies and EPA can develop and implement more effective compliance improvement programs directed at MHPs.

Keywords: *Mobile homes, *Water pollution standards, *Potable water, *Water distribution, *Distribution systems, *Compliance, Microorganisms, Standards compliance, Texas, Pollution regulations, Case studies, Trailers, Water treatment, Implementation, Law enforcement, Information dissemination, Notification procedures, Technical assistance, Training, *Small systems, National Primary Drinking Water Regulations, EPA Region 4.

PB92-164722/REB PC A04/MF A01
Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.
Handbook for Special Public Notification for Lead for Public Drinking Water Suppliers.
Kansas Univ., Kansas City.
S. Hick, and R. Buchanan. Mar 88, 57p EPA/570/9-88/002
Grant EPA-T007287-01
See also PB89-122139. Sponsored by Environmental Protection Agency, Washington, DC. Office of the Assistant Administrator for Water.

The handbook outlines the process of making the special public notification pertaining to lead in drinking water. It includes what information must be provided to the public about lead, even when there has been no violation of the drinking water standards for lead; the different types of notices and examples of each; and the kind of information that should be included in a public notice. The handbook also includes a glossary of technical terms and acronyms, a copy of the portion of the statute that pertains to the special notice for lead, and a copy of the portion of the federal regulations pertaining to special public notification for lead.

Keywords: *Pollution, *Standards, *Lead(Metal), *Mass communication, Handbooks, Public health, Newspapers, Letters, Requirements, Statutes, Inorganic compounds, Communities, Water pipelines, Dictionaries, *Drinking water.

PB92-164755/REB PC A08/MF A02
Environmental Protection Agency, Washington, DC. Office of Drinking Water.
Handbook of State Management Practices, July 1984.
American Water Works Association Research Foundation, Denver, CO.
Jul 84, 172p EPA/570/9-85/2
Grant EPA-T-901362
Sponsored by Environmental Protection Agency, Washington, DC. Office of Drinking Water.

The handbook is a compendium of program skills and experience in many states. It has a special focus on the problems of small water systems but also addresses a range of state program concerns. Topics covered include overall program management; compliance; data management; water system design; government and public relations; funding and budgeting; laboratories; training and technical assistance; and legal, administrative, and institutional approaches to small systems.

Keywords: *Water supply, *Water distribution, *States programs, *Project management, Handbooks, Project planning, Training, Reporting, Design criteria, Standards, Publicity, Mass communications, Laboratories, Financing, Law enforcement, Budgets, Emergencies, Cost analysis, *Small water systems.

PB92-164763/REB PC A12/MF A03
Manual of Protective Action Guides and Protective Actions for Nuclear Incidents.
Office of Radiation Programs, Washington, DC.
Oct 91, 257p EPA/400/R-92/001
See also PB90-184284 and AD-A119 287.

Public officials are charged with the responsibility to protect the health of the public during hazardous incidents. The purpose of the manual is to assist these officials in establishing emergency response plans and in making decisions during a nuclear incident. It provides radiological protection guidance that may be used for responding to any type of nuclear incident or radiological emergency, except nuclear war. The manual begins with a general discussion of Protective Action Guides (PAGs) and their use in planning for protective actions to safeguard public health. It then presents PAGs for specific exposure pathways and associated time periods. These PAGs apply to all types of

nuclear incidents. This is followed by guidance for the implementation of PAGs. Finally, appendices provide definitions, background information on health risks, and other information supporting the choice of the numerical values of the PAGs.

Keywords: *Radiation protection, *Emergency planning, *Public health, Manuals, Nuclear power plants, Implementation, Path of pollutants, Exposure, Radiation dosage, Ingestion(Biology), Radioactive effluents, Air pollution effects(Humans), Reactor accidents, Radioecology, Radionuclide migration, Guidelines, *Protective Action Guides.

PB92-164789/REB PC **A05**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Drinking Water Research Div.
Removing Radium from Water by Plain and Treated Activated Alumina.
Houston Univ., TX. Dept. of Civil and Environmental Engineering.
D. Garg, and D. Clifford. Apr 92, 85p EPA/600/R-92/048
See also PB84-189810 and PB88-158464. Sponsored by Environmental Protection Agency, Cincinnati, OH. Drinking Water Research Div.

The research determined the feasibility of using BaSO4-impregnated activated alumina and plain activated alumina for radium removal from groundwater by fixed-bed adsorption. The major factors influencing radium adsorption onto the two types of alumina were identified. The radium regenerability of the aluminas was also studied. Good to excellent radium removals were obtained depending on the chemical composition of the feedwater. For example, BaSO4-impregnated alumina treated 25,000 bed volumes (BV) and plain alumina treated 14,000 BV of influent before radium and maximum contaminant level (MCL) breakthrough. The presence of sulfate ions in the feedwater enhanced, and the presence of barium inhibited radium adsorption on both types of alumina. The water hardness significantly reduced radium removal by plain alumina, although it had little effect on removal by BaSO4-impregnated alumina.

Keywords: *Ground water, *Radium, *Water treatment, Removal, Barium sulfates, Adsorption, Aluminum oxides, Beds(Process engineering), Performance evaluation, *Drinking water, Activated alumina, Radium 226.

PB92-164870/REB PC **A01**/MF **A01**
Carcinogens and Human Health: Part 3. Letter to the Editor. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
M. J. Mass, and S. Nesnow. c1992, 5p EPA/600/J-92/117
Pub. in Science Magazine, v251, n4994 p606-607, 8 Feb 91.

Letter to Editor is a coordinated Office of Research and Development (ORD) response and addresses previously published criticisms of aspects of Environmental Protection Agency policy on risk assessment or carcinogens. The authors of the letter feel that currently used toxicity tests are misleading in labelling substances 'carcinogenic' or 'noncarcinogenic', and the practice of performing high-dose toxicity testing can lead to more misinterpretations.

Keywords: *Carcinogens, *Toxicology, *Health hazards, Humans, Bioassay, Dose-response relationships, Risk assessment, Synergism, Risk assessment, Reprints.

PB92-164888/REB PC **A03**/MF **A01**
Exposure of Humans to a Volatile Organic Mixture. 2. Sensory. Journal article.
Health Effects Research Lab., Research Triangle Park, NC.
H. K. Hudnell, D. A. Otto, D. E. House, and L. Molhave. c1992, 11p EPA/600/J-92/118
Pub. in Archives of Environmental Health, v47 n1 p31-38 Feb 92. See also PB90-186438.Portions of this document are not fully legible. Prepared in cooperation with Aarhus Univ. (Denmark). Inst. for Miljoe- og Arbejdsmedicin.

Time-course functions for symptoms of the sick building syndrome were derived from 66 healthy males exposed to clean air and a volatile organic compound (VOC) mixture in separate sessions. The mixture contained 22 VOCs (25 mg/cu m total concentration) commonly found air-borne in new or recently renovated buildings. Subjects rated the intensity of perceived irritation, odor, and other variables before and twice during 2.75 hr exposure periods. Eye and throat irritation, headache, and drowsiness increased or showed no evidence of adaptation during exposure, whereas odor intensity decreased by 30%. These results indicate that irritation intensity and other symptoms are not related in any simple fashion to odor intensity, suggesting that the symptoms may not be a psychosomatic response to detection of an aversive odor. Instead, subthreshold levels of VOCs may interact additively or hyperadditively and stimulate trigeminal nerve receptors.

Keywords: *Air pollution effects(Humans), *Psychomotor performance, *Senses, Signs and symptoms, Toxicology, Questionnaires, Potentiometry, Mixtures, Indoor air pollution, Trigeminal nerve, Reprints, *Volatile organic compounds, *Sick building syndrome.

PB92-164953/REB PC **A02**/MF **A01**
Proximity of Louisiana Sanitary Landfills to Wetlands and Deepwater Habitats. Journal article.
Environmental Monitoring Systems Lab., Las Vegas, NV.
V. W. Lambou, R. C. Herndon, J. E. Moerlins, M. Kuperberg, and R. L. Gebhard. c1991, 9p EPA/600/J-92/125
Pub. in Proceedings of the Louisiana Academy of Sciences 54, p30-36 1991. See also PB90-150814. Prepared in cooperation with Florida State Univ., Tallahassee. Center for Biomedical and Toxicological Research and Hazardous Waste Management, and National Wetlands Inventory, St. Petersburg, FL.

Sanitary landfills can cause considerable harm to sensitive ecosystems if they are not properly located, designed, and managed. The proximity of Louisiana sanitary landfills to wetlands and deepwater habitats was determined by drawing three concentric 1/4 mile, 1/2 mile, and 1 mile rings around the point representing the location of each landfill on U.S. Fish and Wildlife Service's National Wetland Inventory maps. Forty seven of 97 known Louisiana sanitary landfills were located on NWI maps; 81 percent of these were found to be in or within 1/4 mile of wetlands or deepwater habitats. These facilities have the potential to adversely affect sensitive ecosystems, such as wetlands and deepwater habitats, either through habitat alterations or through the migration of contaminants from sanitary landfills.

Keywords: *Water pollution effects, *Earth fills, *Ecosystems, *Deep-water habitats, *Waste disposal, Environmental transport, Louisiana, Surface waters, Path of pollutants, Reprints.

PB92-500024/REB CD-ROM$45.00
Toxic Release Inventory (TRI) 1987-1989, (on CD-ROM). Data file.
Environmental Protection Agency, Washington, DC. Office of Toxic Substances.
1989, CD-ROM* EPA/DF/CD-92/001
System: DOS Compatible; PC DOS 3.3 operating system. 640K Hard Disk Required, Microsoft Extensions 3.3. Supersedes PB90-502311. See also PB90-502030 (1988), PB89-186068 (1987). Includes user instructions.
The datafile is on one (1) 4.72 inch disc. Data format: ISO 9660. The diskette is in ASCII format.

Section 313 of the Emergency Planning and Community Right-to-Know Act (also known as Title III) of the Superfund Amendments and Reauthorization Act of 1986 (Public Law 99-499) requires EPA to establish a National Inventory of toxic chemical emission from certain facilities. The following information is required: 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. The law mandates that the data be made publicly available through a computer database.

Keywords: *Toxic substances, *Data file, *Waste management, *Chemical compounds, CD-ROM, Diskettes, Land pollution, Air pollution, Water pollution, Manufacturing, Requirements, Industrial plants, Emergency plans, Public information, Study estimates, Waste disposal, Waste treatment, Pollution regulations, *Toxic Release Inventory, *Emission inventories, Waste minimization, Emergency Planning and Community Right-to-Know Act.

PB92-500354/REB CP **D02**
Volatile Organic Compound and Particulate Matter (VOC/PM) Speciation Data Base Management System (SPECIATE), Version 1.4 (for Microcomputers). Data file.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Oct 91, 1 diskette* EPA/DF/DK-92/016
System: IBM PC or compatible; MS DOS 3.0 or higher operating system, 8K. Language: Compiled dBase files. File contains compressed data. User will follow instructions and unpack file by typing unpack after making subdirectory SPECIATE. System will then build indexes. dBase is not needed to run the system. Supersedes PB90-501560. See also PB88-157888, PB87-230660, and PB86-146511.
The datafile is on one 5 1/4 inch diskette, 1.2M high density. File format: ASCII. Documentation included; may be ordered separately as PB92-105527.

SPECIATE presents Volatile Organic Compound (VOC) and Particulate Matter (PM) species profiles for more than 400 source categories. The species profiles consist of weight percentages of individual compounds of total VOC and total PM. Speciation factors are used to estimate emissions of air toxics from emission factors or estimates of total VOC's and PM. Speciated emission factors are also presented in the data base.

Keywords: *Volatile organic compounds, *Particulates, *Data base management systems, *Data file, *Air pollution, Diskettes, Toxic substances, Emission factors, Study estimates, Profiles, *SPECIATE system.

PB92-500479/REB CP **T02**
Aquatic Toxicity Information on VAX VMS Backup (ACQUIRE for VMS). Data file.
Environmental Research Lab.-Duluth, MN.
Sep 91, mag tape EPA/DF/MT-92/020
System: DEC VAX 11/785; VMS 5.4 operating system. Supersedes PB89-170344. See also PB92-500453.
Available in 9-track, ASCII character set, 1600 or 6250 bpi. For 6250 bpi, the price is T02.

The purpose of Acquire is to provide scientists and managers quick access to a comprehensive, systematic, computerized compilation of aquatic toxicity data. Scientific papers published both nationally and internationally on the toxicity of chemicals to aquatic organisms and plants are collected and reviewed for ACQUIRE. Independently compiled data files that meet ACQUIRE parameter and quality assurance criteria are also included. Selected toxicity test results and related testing information for any individual chemical from laboratory and field aquatic toxicity effects are included for tests with freshwater and marine organisms. The total number of data records in ACQUIRE is now over 105,300. This includes data from 6000 references, for 5200 chemicals and 2400 test species. A major data file, Acute Toxicity of Organic Chemicals (ATOC), has been incorporated into ACQUIRE. The ATOC file contains laboratory acute test data on 525 organic chemicals using juvenile fathead minnows.

Keywords: *Data file, *Aquatic plants, *Aquatic animals, *Toxicity, *Water pollution effects, *Aquatic organisms, Magnetic tapes, Fresh water biology, Marine biology, Chemical compounds, Toxic substances, Organic compounds, Water pollution effects(Plants), Water pollution effects(Animals), *ACQUIRE data base.

PB92-500842/REB MagTape$1500.00
Regional Oxidant Model (ROM), (Source Code Only) (Version 2.1). Model-Simulation.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.

Jan 91, mag tape* EPA/SW/MT-92/023
System: VMS 5.1 and MVS/ESA Version 3.1.3 operating system. Language: FORTRAN. File format: ASCII. Software developed on IBM and VAX computers. Users may have difficulty adapting to other computers. AVAILABLE 6250 BPI ONLY. Other formats available as PB92-500859 (Source Code Only and Test Data). Available in 9-track tape, 6250 bpi only. Documentation included; may be ordered separately as PB91-171918 and PB92-120872.

The Regional Oxidant Model (ROM) is a three-dimensional photochemical Eulerian grid model designed to simulate ambient concentrations of ozone and related species. ROM is a 3-layer model with a horizontal resolution of approximately 19 km; each grid cell has dimensions of 1/6 degree latitude by 1/4 degree longitude. The typical horizontal extent of the modeling domain is 1000 km. The model is designed to simulate hourly regional concentrations of ozone during largely stagnant summertime conditions that are associated with elevated smog episodes. The model is designed so that its preprocessors run on a VAX and the core model runs on an IBM mainframe. A typical 3-day simulation of the core model for the northeastern U.S. uses 9.5 hours of CPU on an IBM 3090. A total of 19 computer tapes comprise this release of the ROM (Version 2.1). Six of the tapes were generated on an IBM, and 13 tapes were generated on a VAX. The tapes contain source code, sample runstreams, and test data for a 3-day simulation. Potential users of the ROM should be aware that the modeling system is complex and requires extensive computer resources. The services of engineers, meteorologists, or computer scientists experienced in photochemical grid modeling are required.

Keywords: *Models-simulation, *Software, *Air pollution, *Photochemical reactions, *Atmospheric chemistry, Magnetic tapes, Three-dimensional calculations, Concentration(Composition), Ozone, Atmospheric composition, Smog, Study estimates, *Regional Oxidant Model, IBM computers, VAX computers.

PB92-500859/REB MagTape$4000.00
Regional Oxidant Model (ROM), Source Code and Test Data (Version 2.1). Model-Simulation.
Environmental Protection Agency, Research Triangle Park, NC. Atmospheric Research and Exposure Assessment Lab.
Jan 91, mag tape* EPA/SW/MT-92/024
System: VMS 5.1 and MVS/ESA Version 3.1.3 operating system. Language: FORTRAN. File format: ASCII and EBCDIC. Software developed on IBM and VAX computers. Users may have difficulty adapting to other computers. AVAILABLE IN 6250 BPI ONLY. Other formats available as PB92-500842 (Source Code Only). Available in 9-track tape, 6250 bpi. Documentation included; may be ordered separately as PB91-171918 and PB92-120872.

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Keywords: *Models-simulation, *Software, *Air pollution, *Photochemical reactions, *Atmospheric chemistry, Magnetic tapes, Ozone, Concentration(Composition), Data processing, Atmospheric composition, Three-dimensional calculations, Study estimates, *Regional Oxidant Model, IBM computers, VAX computers.

PB92-501139/REB CP D04
National Acid Precipitation Assessment Program (NAPAP) Emissions Inventory, 1985 (Version 2). Development of the Annual Data and Modelers' (for Microcomputers). Data file.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
1985, 7 diskettes EPA/DF/DK-92/025
System: IBM-PC; MS DOS operating system.
The datafile is on seven 5 1/4 inch diskettes, 360K double density. File format: Lotus 1-2-3 (Version 2.01).

The National Acid Precipitation Assessment Program 1985 (Version 2): Development of the Annual Data and Modelers data summary tables are included in Appendix A of the report. Each of the files represent one table from the appendix, with the exception of the tables covering the point source summaries for the US by SCC. These tables are quite lengthy and have been divided into lists for all SCCs by the pollutant groups as represented in the Appendix tables.

Keywords: *Data file, *Air pollution, Diskettes, Point sources, Tables(Data), Acid rain, *National Acid Precipitation Assessment Program, *Emission inventories.

PB92-501212/REB CP D03
Hazardous Air Pollutant Program (HAP-PRO). Version 1 (for Microcomputers). Software.
Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.
16 Sep 91, 3 diskettes EPA/SW/DK-92/025
System: IBM-PC or Compatible; MS-DOS 3.1 or later operating system, 640K. Requires a hard disk with at least 1Mb free and 512K free minimum RAM.
The software is on three 5 1/4 inch diskettes, 360K double density. File format: DBS. Documentation included may be ordered separately as PB92-135904.

The Hazardous Air Pollutant Program (HAP-PRO) assists permit engineers in reviewing applications for control of air toxics by calculating the capital and annual costs for six volatile organic compound (VOC) and three particulate control devices, including selected engineering parameters, which may be used to help pinpoint errors in the engineering desig. Calculations used by the program mirror those presented in the revised EPA handbook, Control Technologies for Hazardous Air Toxics. A secondary purpose of HAP-PRO is to generate lists of all facilities containing a specified pollutant in their emission streams or a specified type of emission steam (organic or inorganic vapors and particulates). HAP-PRO's features include context-sensitive help to assist in data input, a windowed environment to provide a referential trail of the user's actions, lookup tables containing the characteristics of many common pollutants, and the ability to select air toxics either form an alphabetical list or by SIC category.

Keywords: *Software, *Air pollution control equipment, *Toxic substances, *Cost analysis, Diskettes, Volatile organic compounds, Particles, Listings, Standard industrial classification, Capitalized costs, Design criteria, Performance evaluation, Mathematical models, *Hazardous Air Pollutant Program.

PB92-501386/REB CP T05
Toxic Substances Control Act (TSCA) Chemical Substances Inventory: Revised Inventory Synonym and Preferred Name File, January 1992. Data file.
Environmental Protection Agency, Washington, DC.
Jan 92, mag tape* EPA/DF/MT-92/027
System: IBM 3081 K84; MVS-XA SP 2.2.3-DFP 3.1 operating system. File format: EBCDIC. Supersedes PB91-510024. See also PB86-220795 and PB86-220803.
Available in 9-track EBCDIC character set, 1600 or 6250 bpi. For 6250 bpi, the price is T05. Documentation included; may be ordered separately as PB92-140755.

The computer tape contains the Inventory Synonym Name File and the Inventory Preferred Name File of the Toxic Substances Control Act (TSCA) Toxic Substance Inventory. These files reflect the 60,719 substances on the non-confidential Inventory file as of the current issue. The EPA 'N' flag, which indicates a polymeric substance containing no free-radical initiator in its inventory name, but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used, appears on these tapes for the appropriate polymers that were included in the 1990 Supplement. The tapes do not include the flag for polymers that were listed in the 1985 Edition. A review of the statistics for the amounts of CBI and non-CBI records on the source file and the file that produced these tapes, as well as the types of data elements selected, confirms that no TSCA CBI data are on the tapes.

Keywords: *Data file, *Environmental surveys, *Chemical compounds, Magnetic tapes, Free radicals, Polymers, Revisions, *Toxic Substance Control Act, *Chemical Substance Inventory, CAS Registry Number, Chemical nomenclature.

PB92-501436/REB CP D02
Standardized Costs for Water Supply Distribution (for Microcomputers). Model-Simulation.
Environmental Protection Agency, Cincinnati, OH. Risk Reduction Engineering Lab.
Sep 91, 1 diskette* EPA/SW/DK-92/028
System: IBM PC/AT; MS DOS 3.1 operating system, 512K. Language: Microsoft FORTRAN.
The software is on one (1) 3 1/2 inch diskette, 1.44M high density File format: ASCII. Documentation included; may be ordered separately as PB92-141290.

The model can calculate cost data for construction and operation/maintenance of domestic water distribution and transmission pipelines, water pumping stations, and water storage reservoirs. By varying the input data, it is possible to perform sensitivity analysis on a proposed system cost or compare the cost of alternative designs. In addition to new construction costs, it is also possible to make cost estimates for expansion, rehabilitation, and repair of existing systems.

Keywords: *Models-Simulation, *Software, *Water distribution, *Water supply, *Costs, Economic analysis, Water pipelines, Water storage, Reservoirs, Construction costs, Maintenance, Diskettes.

PB92-501626/REB CP D02
Crosswalk/Air Toxic Emission Factor Data Base Management System (XATEF), (Version 1.2) (for Microcomputers). Software.
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Oct 91, 1 diskette* EPA/SW/DK-92/030
System: IBM PC Compatible; PC DOS 3.0 or higher operating system, 20K. Language: Compiled DBase files. Supersedes PB91-507889.
The software is on one (1) 5 1/4 inch diskette, 1.2M high density. Documentation included; may be ordered separately as PB92-145556.

Crosswalk/Air Toxic Emission Factor Data Base Management System (XATEF) presents a qualitative association of pollutants and sources or air pollutant/source 'crosswalk' and presents air toxic emission factors. More than 15,000 crosswalk associations are presented. More than 7,600 emission factors for 400 air toxics are presented. The following items are included: SIC code, SCC, pollutant name, CAS number, SIC description, SCC description, industrial process description, operating process description, notes about control and derivation of factors, and references.

Keywords: *Software, *Emission factors, *Air pollution, *Toxic substances, *Data base management systems, Diskettes, Pollution sources, Chemical compounds, Standard Industry Classifications, *XATEF system, *Crosswalk/Air Toxic Emission Factor Data Base Management System, Chemical nomenclature, CAS Registry Numbers, Source Classification Codes.

PB92-780873/REB PC$97.50/MF$42.50
Pesticide Applicator Training Materials: A Bibliography. Bibliographies and literature of agriculture.
National Agricultural Library, Beltsville, MD.
B. O. Stommel. Aug 91, 338p USDA/BLA-106
Prepared in cooperation with Environmental Protection Agency, Washington, DC.

The citations within the bibliography are arranged alphabetically by title under the PATC category listed in the table of contents. The body of each citation begins with a title (A) that appears in bold print. The remainder the first paragraph includes, if applicable: authors (B), the place of publication (C), publisher (D), date(s) of publication (E), pagination or extent of the item (F),

special features (G), dimensions (H), the series (I), in which the item is published, and the number (J) of the item within that series. These elements are followed by: the place of publication (K), the language of the text (L), the PATC categories (M) assigned to the publication, an abstract (N) describing the publication, and finally the NAL call number (O).

Keywords: *Bibliographies, *Pesticides, *Specialized training, *Occupational safety and health, Pest control, Agriculture, Environmental effects, Protective equipment, *Training manuals, *Pesticide Applicator Training Collection.

PB92-922400/REB Subscription$96.00
RCRA, Superfund Monthly Hot Line Reports. Monthly repts.
Environmental Protection Agency, Washington, DC. Office of Solid Waste.
1992, 12 issues
Available on subscription, U.S., Canada, and Mexico price $96.00; price for others $192.00. Also available individually. Back year sets and indexes are available to 1982.

The RCRA/SF Hotline quickly responds to questions related to the Resource Conservation and Recovery Act (RCRA), the comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Underground Storage Tanks (UST) program, the Superfund Amendments Reauthorization Act (SARA), and the Chemical emergency Preparedness (CEPP) Community Right-to-know Act/Title III program. The hotline is the mechanism for EPA's response to inquiries from the public and regulated community; the referral point for document availability; the dissemination of changing information; and the primary means for answering factual questions on EPA regulations and policies. The Monthly Hotline Reports contain questions posed by the callers that were either significant and required the EPA to resolve the issues or were the most frequently asked questions. Also included in the Reports are the Federal Register summaries, publications availabilities, and call statistics.

Keywords: *Hazardous materials, *Government policies, *Law(Jurisprudence), *Pollution abatement, *Periodicals, US EPA, Regulations, Technical assistance, Communities, Local government, State government, Documents, Availability, Statistical data, *Superfund, RCRA(Resource Conservation and Recovery Act), CERCLA(Environmental Response), Compensation and Liability Act, SARA(Superfund Amendments Reauthorization Act).

PB92-963201/REB PC **A03**/MF **A01**
Implementation of the Superfund Alternative Remedial Contracting Strategy (ARCS): Report of the Administrator's Task Force. Implementation Plan. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Nov 91, 32p OSWER-9201.0-01
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.

The report includes results of a Task Force analysis of the criticism the EPA received about the management of the Superfund contracting program. EPA was accused of allowing Superfund contractors to spend an inordinate amount of public funds on activities other than the direct clean-up of contaminated sites. The document provides a summary of recommendations, strategies and proposed milestones to implement.

Keywords: *Hazardous materials, *Project management, *Pollution control, US EPA, Contract administration, Funds, Expenses, Contractors, Payment, Cost overruns, Recommendations, *Superfund, Cleanup.

PB92-963202/REB PC **A03**/MF **A01**
OSWER Superfund Telephone Directory, October 1991. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 91, 41p OSWER-9200.0-03D
Supersedes PB91-921328.
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is a telephone directory of Superfund Headquarters and regional contacts. The directory is published on a semi-annual basis.

Keywords: *Hazardous materials, *US EPA, *Directories, Telephones, Facilities, *Superfund, *Office of Solid Waste and Emergency Response, EPA regions.

PB92-963203/REB
see individual report for order number and price
National Priorities List Sites.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
1991,49 issues
Also available as a package containing 49 NPL Sites Volumes and 1 National Overview Volume, PB92-963253. See also PB91-921215.
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.

Together with the companion national overview volume the publication provides general Superfund background information and descriptions of activities at each State National Priorities List (NPL) site. The report clearly describes what the problems are, what EPA and others participating in site cleanups are doing, and how the nation can move ahead in solving these serious problems. Also included are sites summary fact sheets on each State site being cleaned up under the Superfund program.

EPA/540/8-91/023. Connecticut. 1991, 70p PC A04, MF A01 **PB92-963203/REB**
EPA/540/8-91/034. Maine. 1991, 59p PC A04, MF A01 **PB92-963204/REB**
EPA/540/8-91/043. New Hampshire. 1991, 74p PC A04, MF A01 **PB92-963205/REB**
EPA/540/8-91/036. Massachusetts. 1991, 96p PC A05, MF A01 **PB92-963206/REB**
EPA/540/8-91/065. Puerto Rico. 1991, 59p PC A04, MF A01 **PB92-963207/REB**
EPA/540/8-91/046. New York. 1991, 216p PC A10, MF A03 **PB92-963208/REB**
EPA/540/8-91/047. North Carolina. 1991, 87p PC A05, MF A01 **PB92-963209/REB**
EPA/540/8-91/054. South Carolina. 1991, 87p PC A05, MF A01 **PB92-963210/REB**
EPA/540/8-91/038. Minnesota. 1991, 133p PC A07, MF A02 **PB92-963211/REB**
EPA/540/8-91/056. Texas. 1991, 102p PC A06, MF A02 **PB92-963212/REB**
EPA/540/8-91/031. Kansas. 1991, 64p PC A04, MF A01 **PB92-963213/REB**
EPA/540/8-91/040. Missouri. 1991, 87p PC A05, MF A01 **PB92-963214/REB**
EPA/540/8-91/057. Utah. 1991, 63p PC A04, MF A01 **PB92-963215/REB**
EPA/540/8-91/019. Arizona and Nevada. 1991, 69p PC A04, MF A01 **PB92-963216/REB**
EPA/540/8-91/059. Virginia. 1991, 83p PC A05, MF A01 **PB92-963217/REB**
EPA/540/8-91/035. Maryland. 1991, 67p PC A04, MF A01 **PB92-963218/REB**
EPA/540/8-91/027. Idaho. 1991, 60p PC A04, MF A01 **PB92-963219/REB**
EPA/540/8-91/020. Arkansas. 1991, 63p PC A04, MF A01 **PB92-963220/REB**
EPA/540/8-91/050. Oklahoma. 1991, 61p PC A04, MF A01 **PB92-963221/REB**
EPA/540/8-91/033. Louisiana. 1991, 63p PC A04, MF A01 **PB92-963222/REB**
EPA/540/8-91/017. Alabama. 1991, 64p PC A04, MF A01 **PB92-963223/REB**
EPA/540/8-91/039. Mississippi. 1991, 47p PC A03, MF A01 **PB92-963224/REB**
EPA/540/8-91/055. Tennessee. 1991, 69p PC A04, MF A01 **PB92-963225/REB**
EPA/540/8-91/026. Georgia. 1991, 68p PC A04, MF A01 **PB92-963226/REB**
EPA/540/8-91/032. Kentucky. 1991, 75p PC A04, MF A01 **PB92-963227/REB**
EPA/540/8-91/024. Delaware. 1991, 82p PC A05, MF A01 **PB92-963228/REB**
EPA/540/8-91/061. West Virginia. 1991, 51p PC A04, MF A01 **PB92-963229/REB**
EPA/540/8-91/053. Rhode Island. 1991, 64p PC A04, MF A01 **PB92-963230/REB**
EPA/540/8-91/058. Vermont. 1991, 57p PC A04, MF A01 **PB92-963231/REB**
EPA/540/8-91/045. New Mexico. 1991, 61p PC A04, MF A01 **PB92-963232/REB**
EPA/540/8-91/042. Nebraska. 1991, 56p PC A04, MF A01 **PB92-963233/REB**
EPA/540/8-91/030. Iowa. 1991, 80p PC A05, MF A01 **PB92-963234/REB**
EPA/540/8-91/041. Montana. 1991, 59p PC A04, MF A01 **PB92-963235/REB**
EPA/540/8-91/048. North Dakota and South Dakota. 1991, 55p PC A04, MF A01 **PB92-963236/REB**
EPA/540/8-91/022. Colorado. 1991, 79p PC A05, MF A01 **PB92-963237/REB**
EPA/540/8-91/063. Wyoming. 1991, 47p PC A03, MF A01 **PB92-963238/REB**
EPA/540/8-91/021. California and Hawaii. 1991, 232p PC A11, MF A03 **PB92-963239/REB**
EPA/540/8-91/052. Pennsylvania. 1991, 250p PC A11, MF A03 **PB92-963240/REB**
EPA/540/8-91/044. New Jersey. 1991, 279p PC A13, MF A03 **PB92-963241/REB**
EPA/540/8-91/064. American Samoa, Guam, and the Trust Territories. 1991, 49p PC A03, MF A01 **PB92-963242/REB**
EPA/540/8-91/062. Wisconsin. 1991, 122p PC A06, MF A02 **PB92-963243/REB**
EPA/540/8-91/060. Washington. 1991, 139p PC A07, MF A02 **PB92-963244/REB**
EPA/540/8-91/051. Oregon. 1991, 57p PC A04, MF A01 **PB92-963245/REB**
EPA/540/8-91/049. Ohio. 1991, 111p PC A06, MF A02 **PB92-963246/REB**
EPA/540/8-91/037. Michigan. 1991, 205p PC A10, MF A03 **PB92-963247/REB**
EPA/540/8-91/028. Illinois. 1991, 117p PC A06, MF A02 **PB92-963248/REB**
EPA/540/8-91/029. Indiana. 1991, 113p PC A06, MF A02 **PB92-963249/REB**
EPA/540/8-91/025. Florida. 1991, 152p PC A08, MF A02 **PB92-963250/REB**
EPA/540/8-91/018. Alaska. 1991, 53p PC A04, MF A01 **PB92-963251/REB**

PB92-963255/REB PC **A03**/MF **A01**
Superfund: Reporting on Cleanup Activities through Environmental Indicators. FY 1991 Update.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Sep 91, 12p EPA/9200.5-07A
See also PB91-921203.
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report examines the work done by EPA over the past ten years to show progress and accomplishments on sites that have not yet been deleted from the list of the most dangerous areas.

Keywords: *Sites, *Hazardous materials, *Pollution control, Reporting, US EPA, Emergencies, Risk assessment, Exposure, Humans, *Superfund, *Cleanup, Remedial action, National Priorities List, Environmental indicators.

PB92-963257/REB PC **A02**/MF **A01**
Superfund Contracts Management Issues. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
31 Jan 92, 7p OSWER-9242.2-06
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The directive initiates new requirements regarding the development of independent government cost estimates, review of contractor invoices, and the appropriate participation on Performance Evaluation Boards.

Keywords: *Hazardous materials, *Pollution control, *Contract administration, Cost estimates, Directives, Requirements, Government policies, Performance evaluation, *Superfund.

PB92-963258/REB PC **A01**/MF **A01**
Implementation of the Alternative Remedial Contracting Strategy (ARCS) Task Force Recommendations: Transmittal of the Implementation Plan. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
22 Jan 92, 5p OSWER-9242.2-05

Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The memorandum transmits the Implementation Plan for the recommendations embodied in the Alternative Remedial Contracting Strategy (ARCS) Task Force Report.

Keywords: *Hazardous materials, *Pollution control, *Contract administration, Recommendations, Contracts, Improvement, Regional analysis, *Superfund, Alternative Remedial Contracting Strategy.

PB92-963304/REB PC A07/MF A02
NPL Characterization Project: National Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 138p EPA/540/8-91/069, OSWER-9345.1-09-0
Paper copy available on Standing Order, deposit account required (Minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program. It is intended to provide a 'snapshot' of national sites on the NPL as of February 1991. Separate reports are available for the ten individual EPA Regions.

Keywords: *Hazardous materials, *Pollution control, *United States, Sites, Assessments, Inspection, Ranking, Data collection, Describing, Industrial wastes, Waste treatment, Environmental transport, Tables(Data), Graphs(Charts), *Superfund, *National Priorities List, Site characterization, *US EPA Region 1-10.

PB92-963305/REB PC A05/MF A01
NPL Characterization Project: Region 1 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 96p EPA-540/8-91/070, OSWER-9345.1-09-1
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program. It is intended to provide a 'snapshot' of sites in Region 1 on the NPL as of February 1991. Separate reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Pollution control, Sites, Assessments, Inspection, Ranking, Data collection, Describing, Industrial wastes, Waste treatment, Environmental transport, Tables(Data), Graphs(Charts), *Superfund, *National Priorities List, Site characterization, *US EPA Region 1.

PB92-963306/REB PC A05/MF A01
NPL Characterization Project: Region 2 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 96p EPA/540/8-91-071, OSWER-9345.1-09-2
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program. It is intended to provide a 'snapshot' of sites in Region 2 on the NPL as of February 1991. Separate reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Pollution control, Sites, Assessments, Inspection, Ranking, Data collection, Describing, Industrial wastes, Waste treatment, Environmental transport, Tables(Data), Graphs(Charts), *Superfund, *National Priorities List, Site characterization, *US EPA Region 2.

PB92-963307/REB PC A05/MF A01
NPL Characterization Project: Region 3 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 96p EPA/540/8-91/072, OSWER-9345.1-09-3
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program. It is intended to provide a 'snapshot' of sites in Region 3 on the NPL as of February 1991. Separate reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Pollution control, Sites, Assessments, Inspection, Ranking, Data collection, Describing, Industrial wastes, Waste treatment, Environmental transport, *Superfund, *National Priorities List, Site characterization, *US EPA Region 3.

PB92-963308/REB PC A05/MF A01
NPL Characterization Project: Region 4 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 96p EPA/540/8-91/073, OSWER-9345.1-09-4
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program. It is intended to provide a 'snapshot' of sites in Region 4 on the NPL as of February 1991. Separate reports are available for the other nine EPA regions and for the nation as a whole.

Keywords: *Hazardous materials, *Pollution control, Sites, Assessments, Inspection, Ranking, Data collection, Describing, Industrial wastes, Waste treatment, Environmental transport, Tables(Data), Graphs(Charts), *Superfund, *National Priorities List, Site characterization, *US EPA Region 4.

PB92-963309/REB PC A05/MF A01
NPL Characterization Project: Region 5 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 96p EPA/540/8-91/074, OSWER-9345.1-09-5
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program. It is intended to provide a 'snapshot' of sites in Region 5 on the NPL as of February 1991. Separate reports are available for the other nine EPA regions and for the nation as a whole.

Keywords: *Hazardous materials, *Pollution control, Sites, Assessments, Inspection, Ranking, Data collection, Describing, Industrial wastes, Waste treatment, Environmental transport, Tables(Data), Graphs(Charts), *Superfund, *National Priorities List, Site characterization, *US EPA Region 5.

PB92-963310/REB PC A05/MF A01
NPL Characterization Project: Region 6 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 96p EPA/540/8-91/075, OSWER-9345.1-09-6
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program. It is intended to provide a 'snapshot' of sites in Region 6 on the NPL as of February 1991. Separate reports are available for the other nine EPA regions and for the nation as a whole.

Keywords: *Hazardous materials, *Pollution control, Sites, Assessments, Inspection, Ranking, Data collection, Describing, Industrial wastes, Waste treatment, Environmental transport, Tables(Data), Graphs(Charts), *Superfund, *National Priorities List, Site characterization, *US EPA Region 6.

PB92-963311/REB PC A05/MF A01
NPL Characterization Project: Region 7 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 92p EPA/540/8-91/076, OSWER-9345.1-09-7
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program. It is intended to provide a 'snapshot' of sites in Region 7 on the NPL as of February 1991. Separate reports are available for the other nine EPA regions and for the nation as a whole.

Keywords: *Hazardous materials, *Pollution control, Sites, Assessments, Inspection, Ranking, Data collection, Describing, Industrial wastes, Waste treatment, Environmental transport, Tables(Data), Graphs(Charts), *Superfund, *National Priorities List, Site characterization, *US EPA Region 7.

PB92-963312/REB PC A05/MF A01
NPL Characterization Project: Region 8 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 92p EPA/540/8-91/077, OSWER-9345.1-09-8
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program. It is intended to provide a 'snapshot' of sites in Region 8 on the NPL as of February 1991. Separate reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Pollution control, Sites, Assessments, Inspection, Ranking, Data collection, Describing, Industrial wastes, Waste treatment, Environmental transport, Tables(Data), Graphs(Charts), *Superfund, *National Priorities List, Site characterization, *US EPA Region.

PB92-963313/REB PC A05/MF A01
NPL Characterization Project: Region 9 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 96p EPA/540/8-91/078, OSWER-9345.1-09-9
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program. It is intended to provide a 'snapshot' of sites in Region 9 on the NPL as of February 1991. Separate reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Pollution control, Sites, Assessments, Inspection, Ranking, Data collection, Describing, Industrial wastes, Waste treatment, Environmental transport, Tables(Data), Graphs(Charts), *Superfund, *National Priorities List, Site characterization, *US EPA Region 9.

PB92-963314/REB PC A05/MF A01
NPL Characterization Project: Region 10 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 96p EPA/540/8-91/079, OSWER-9345.1-09-10
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program. It is intended to provide a 'snapshot' of sites in Region 10 on the NPL as of February 1991. Separate reports are available for the other nine EPA regions and for the nation as a whole.

Keywords: *Hazardous materials, *Pollution control, Sites, Assessments, Inspection, Ranking, Data collection, Describing, Industrial wastes, Waste treatment, Environmental transport, Tables(Data), Graphs(Charts), *Superfund, *National Priorities List, Site characterization, US EPA Region 10.

PB92-963315/REB PC **A06/MF A02**
CERCLIS Characterization Project: National Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 108p EPA/540/8-91/080, OSWER-9345.1-10-0
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report, which is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program, characterizes a sample of national sites in CERCLIS. Separate reports are available for the ten EPA Regions.

Keywords: *Hazardous materials, *Sites, *Assessments, *United States, Data acquisition, Classifying, Inspection, Sampling, Tracking, Ranking, Industrial wastes, Evaluation, Damage assessment, Statistical data, Graphs(Charts), *Superfund, US EPA Region 1-10, *Comprehensive Environmental Response Compensation and Liability Act(CERCLA), *CERCLA Information System(CERCLIS).

PB92-963316/REB PC **A05/MF A01**
CERCLIS Characterization Project: Region 1 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 76p EPA/540/8-91/081, OSWER-9345.1-10-1
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 publication is one in a series of reports providing information on the nature of the sites being evaluated by the Superfund site assessment program and characterizes a sample of Regional sites in CERCLIS. National and Regional NPL (National Priority List) characterization reports cover the NPL characterization project, which provides a snapshot of sites on the NPL as of February 1991.

Keywords: *Hazardous materials, *Sites, *Assessments, Data acquisition, Classifying, Inspection, Sampling, Tracking, Ranking, Evaluation, *Superfund, US EPA Region 1, *CERCLA(Comprehensive Environmental Response Compensation and Liability Act), *CERCLIS(CERCLA Information System), NPL(National Priorities List).

PB92-963317/REB PC **A05/MF A01**
CERCLIS Characterization Project: Region 2 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 76p EPA/540/8-91/082, OSWER-9345.1-10-2
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 publication is one in a series of reports providing information on the nature of the sites being evaluated by the Superfund site assessment program and characterizes a sample of Regional sites in CERCLIS. National and Regional NPL (National Priorities List) characterization reports cover the NPL characterization project, which provides a snapshot of sites on the NPL as of February 1991.

Keywords: *Hazardous materials, *Sites, *Assessments, Data acquisition, Classifying, Inspection, Sampling, Tracking, Ranking, Evaluation, *Superfund, US EPA Region, *CERCLA(Comprehensive Environmental Response Compensation and Liability Act), *CERCLIS(CERCLA Information System), NPL(National Priorities List).

PB92-963318/REB PC **A05/MF A01**
CERCLIS Characterization Project: Region 3 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 88p EPA/540/8-91/083, OSWER-9345.1-10-3
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report, which is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program, characterizes a sample of Region 3 sites in CERCLIS. Separate reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Sites, *Assessments, Data acquisition, Classifying, Inspection, Sampling, Tracking, Ranking, Industrial wastes, Evaluation, Damage assessment, Statistical data, Graphs(Charts), *Superfund, US EPA Region 3, *Comprehensive Environmental Response Compensation and Liability Act(CERCLA), *CERCLA Information System(CERCLIS).

PB92-963319/REB PC **A05/MF A01**
CERCLIS Characterization Project: Region 4 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 80p EPA/540/8-91/084, OSWER-9345.1-10-4
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report, which is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program, characterizes a sample of Region 4 sites in CERCLIS. Separate reports are available for the other nine EPA regions and for the nation as a whole.

Keywords: *Hazardous materials, *Sites, *Assessments, Data acquisition, Classifying, Inspection, Sampling, Tracking, Ranking, Industrial wastes, Evaluation, Damage assessment, Statistical data, Graphs(Charts), *Superfund, US EPA Region 4, *Comprehensive Environmental Response Compensation and Liability Act(CERCLA), *CERCLA Information System(CERCLIS).

PB92-963320/REB PC **A05/MF A01**
CERCLIS Characterization Project: Region 5 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 80p EPA/540/8-91/085, OSWER-9345.1-10-5
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report, which is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program, characterizes a sample of Region 5 sites in CERCLIS. Separate reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Sites, *Assessments, Data acquisition, Classifying, Inspection, Sampling, Tracking, Ranking, Industrial wastes, Evaluation, Damage assessment, Statistical data, Graphs(Charts), *Superfund, *US EPA Region 5, *Comprehensive Environmental Response Compensation and Liability Act(CERCLA), *CERCLA Information System(CERCLIS).

PB92-963321/REB PC **A05/MF A01**
CERCLIS Characterization Project: Region 6 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 80p EPA/540/8-91/086, OSWER-9345.1-10-6
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report, which is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program, characterizes a sample of Region 6 sites in CERCLIS. Separate reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Sites, *Assessments, Data acquisition, Classifying, Inspection, Sampling, Tracking, Ranking, Industrial wastes, Evaluation, Damage assessment, Statistical data, Graphs(Charts), *Superfund, *US EPA Region 6, *Comprehensive Environmental Response Compensation and Liability Act(CERCLA), *CERCLA Information System(CERCLIS).

PB92-963322/REB PC **A05/MF A01**
CERCLIS Characterization Project: Region 7 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 80p EPA/540/8-91/087, OSWER-9345.1-10-7
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report, which is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program, characterizes a sample of Region 7 sites in CERCLIS. Separate reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Sites, *Assessments, Data acquisition, Classifying, Inspection, Sampling, Tracking, Ranking, Industrial wastes, Evaluation, Damage assessment, Statistical data, Graphs(Charts), *Superfund, *US EPA Region 7, *Comprehensive Environmental Response Compensation and Liability Act(CERCLA), *CERCLA Information System(CERCLIS).

PB92-963323/REB PC **A05/MF A01**
CERCLIS Characterization Project: Region 8 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 80p EPA/540/8-91/088, OSWER-9345.1-10-8
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report, which is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program, characterizes a sample of Region 8 sites in CERCLIS. Separate reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Sites, *Assessments, Data acquisition, Classifying, Inspection, Sampling, Tracking, Ranking, Industrial wastes, Evaluation, Damage assessment, Statistical data, Graphs(Charts), *Superfund, US EPA Region 8, *Comprehensive Environmental Response Compensation and Liability Act(CERCLA), *CERCLA Information System(CERCLIS).

PB92-963324/REB PC **A05/MF A01**
CERCLIS Characterization Project: Region 9 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 80p EPA/540/8-91/089, OSWER-9345.1-10-9

Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report, which is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program, characterizes a sample of Region 9 sites in CERCLIS. Separater reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Sites, *Assessments, Data acquisition, Classifying, Inspection, Sampling, Tracking, Ranking, Industrial wastes, Evaluation, Damage assessment, Statistical data, Graphs(Charts), *Superfund, US EPA Region 9, *Comprehensive Environmental Response Compensation and Liability Act(CERCLA), *CERCLA Information System(CERCLIS).

PB92-963325/REB PC **A05/MF A01**
CERCLIS Characterization Project: Region 10 Results.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 80p EPA/540/8-91/090, OSWER-9345.1-10-10
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report is one in a series providing information on the nature of the sites being evaluated by the Superfund site assessment program and characterizing a sample of sites in CERCLIS. Separate reports are available for the other nine EPA Regions and for the nation as a whole.

Keywords: *Hazardous materials, *Sites, *Assessments, Data acquisition, Classifying, Inspection, Sampling, Tracking, Ranking, Industrial wastes, Evaluation, Damage assessment, Statistical data, Graphs(Charts), *Superfund, US EPA Region 10, *Comprehensive Environmental Response Compensation and Liability Act(CERCLA), *CERCLA Information System(CERCLIS).

PB92-963326/REB PC **A03/MF A01**
Revised Hazard Ranking System: Evaluating Sites After Waste Removals. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 91, 11p OSWER-9345.1-03FS
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The fact sheet defines the concept of 'qualifying removal', explains how to score sites where qualifying removals have been conducted, and discusses some of the management implications of the removal policy. In addition, the fact sheet provides examples of how to score sites where removals have occurred.

Keywords: *Hazardous materials, *Project management, *Removal, *Pollution control, Ranking, Sites, Policies, Revisions, Requirements, Time, *Superfund.

PB92-963327/REB PC **A01/MF A01**
Revision of Policy Regarding Superfund Project Assignment between Alternative Remedial Contracting Strategy Contractors and the U.S. Army Corps of Engineers. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
10 Dec 91, 4p OSWER-9242.3-08
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report revises the policy for assigning Superfund remedial work to EPA Alternative Remedial Contracting Strategy (ARCs) contractors and the U.S. Army Corps of Engineers (USACE).

Keywords: *Hazardous materials, *Government policies, *Waste management, US EPA, Project planning, Contract administration, Strategy, US ACE, Design, Alternatives, Contracts, *Superfund, Remedial action, Assignments.

PB92-963328/REB PC **A01/MF A01**
Audits and the Superfund Program Manager. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 91, 2p OSWER-9375.5-04FS-A
Supersedes PB90-272717.
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report describes why audits of all parties to Cooperative Agreements and Superfund State Contracts are good business practices, and how audits help EPA protect the financial integrity of Superfund response agreements.

Keywords: *Hazardous materials, *Pollution control, *Project management, *Auditing, US EPA, State government, Contracts, Local government, Cooperative programs, Protection, Financial management, Agreements, *Superfund.

PB92-963329/REB PC **A01/MF A01**
State and Local Involvement in the Superfund Program. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 91, 5p OSWER-9375.5-01FS-A
Supersedes PB90-273939.
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report includes an overview of hazardous waste laws, the Superfund process, and future directions of the Superfund program. Also, the report describes mechanisms for assuring state and local involvement, and roles of political subdivisions, Indian tribes, and local governments.

Keywords: *Hazardous materials, *Federal law, *Pollution control, US EPA, State government, Local government, Technical assistance, Government agencies, Project management, Contracts, American Indians, Regulations, Agreements, Financing, *Superfund, Cleanup, Response action, Superfund Amendments and Reauthorization Act.

PB92-963330/REB PC **A01/MF A01**
Political Subdivision Involvement in Superfund. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 91, 3p OSWER-9375.5-03FS-A
Supersedes PB90-273954.
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 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, allows EPA to provide funds to States, political subdivisions thereof, and federally recognized Indian Tribes for Superfund response. The definition of political subdivision varies from State to State, since each State determines what units of government meet its legislative definition. A political subdivision can participate in Superfund cleanup as a lead or support agency when EPA and the State agree that this enhances the cleanup process and results in an efficient, economical, and well-coordinated use of resources. To determine this, EPA and the State assess the political subdivision's prior involvement and agree that: The political subdivision is able to conduct the response activities; It is economical and advantageous to designate the political subdivision as lead; and The political subdivision has the authority to enter into a Cooperative Agreement with the Federal Government and to administer Federal dollars.

Keywords: *Funds, *Hazardous materials, *Pollution control, *Law(Jurisprudence), US EPA, State government, Regulations, Counties, Urban areas, Agreements, Cooperation, Requirements, Acceptability, Performance evaluation, *Superfund, *Cleanup, *Comprehensive Environmental Response Compensation and Liability Act, Remedial response, Political subdivisions.

PB92-963331/REB PC **A01/MF A01**
Debarment and Suspension. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 91, 4p OSWER-9200.5-208FS-A
Supersedes PB90-272527.
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report defines debarment and suspension, and describes causes and procedures and authorities for pursuing them. Also the study includes requirements of the Drug-Free Work Place Act.

Keywords: *Hazardous materials, *Federal law, *Funds, *Pollution control, US EPA, Federal assistance programs, Contracts, Agreements, Loans, Investigations, Requirements, *Superfund, *Drug Free Work Place Act, Cleanup, Remedial action.

PB92-963332/REB PC **A06/MF A02**
Administrative Guidance for the FIT to ARCS (FIT/ARCS) Transition. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Nov 91, 113p OSWER-9242.2-03
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The report describes the final administrative guidance for managing pre-remedial, site assessment work under the Alternative Remedial Contracting Strategy (ARCS) contracts.

Keywords: *Hazardous materials, *Pollution control, *Project management, Sites, Assessments, Contracts, Guidelines, Contractors, Investigations, *Superfund, Pre-remedial action, Alternative Remedial Contracting Strategy.

PB92-963335/REB PC **A02/MF A01**
ECO Update: Ecological Assessment of Superfund Sites. An Overview. Volume 1, Number 2, December 1991. Intermittent bulletin.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Dec 91, 10p OSWER-9345.0-05I-VOL-1-NO-2
See also PB90-155599.
Please type 43B message.

The document is an updated framework for ecological assessment in the Superfund Program. It offers a description of ecological assessment components and a discussion of how they fit into the Remedial Investigation and Feasibility Study process. ECO Updates are a series of Intermittent Bulletins intended to facilitate ecological assessment of Superfund sites. Individual bulletins may discuss either technical methods or the management of ecological assessments. These bulletins serve as supplements to Risk Assessment Guidance for Superfund Volume 2: Environmental Evaluation Manual (9285.7-01).

Keywords: *Sites, *Hazardous materials, *Ecology, *Pollution control, Assessments, Feasibility studies, Guidelines, *Superfund, Remedial response.

PB92-963336/REB PC **A03/MF A01**
Estimating Potential for Occurrence of DNAPL at Superfund Sites. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Jan 92, 11p OSWER-9355.4-07FS
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 presence of Dense Nonaqueous Phase Liquids (DNAPL) in soils and aquifers can control the ultimate success or failure of remediation at a hazardous waste site. Because of the complex nature of DNAPL transport and fate, however, DNAPL may often be undetected by direct methods, leading to incomplete site assessments and inadequate remedial designs. Sites affected by DNAPL may require a different conceptual framework to develop effective characterization and remedial actions. To help site personnel determine if

DNAPL-based characterization strategies should be employed at a particular site, a guide for estimating the potential for DNAPL occurrence was developed. The approach, which uses historical site use information and site characterization data, is described in the fact sheet.

Keywords: *Hazardous materials, *Pollution control, Sites, Environmental transport, Soils, Aquifers, Solvents, Concepts, Guidelines, *Superfund, *Dense nonaqueous phase liquids.

PB92-963339/REB PC A02/MF A01
Risk Assessment Guidance for Superfund. Volume 1. Human Health Evaluation Manual (Part B). Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Dec 91, 7p OSWER-9285.7-01BFS
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.

EPA's Human Health Evaluation Manual, which describes the process of gathering information and assessing the risk to human health, and the Environment Evaluation Manual comprise a two-volume set called Risk Assessment Guidance for Superfund (RAGS). The HHEM has three main parts: Part A, which discusses the baseline risk assessment, Part B, Development of Risk-based Preliminary Remediation Goals, and Part C, Risk Evaluation of Remedial Alternatives. The fact sheet is designed to introduce remedial project managers and other personnel to the information that is available in RAGS/HHEM Part B on developing risk-based preliminary remediation goals for chemicals of concern at CERCLA sites.

Keywords: *Toxicity, *Hazardous materials, *Public health, *Pollution control, Project management, Guidelines, Exposure, Humans, Chemical effluents, *Superfund, Risk assessment, *Remediation goals, Comprehensive Environmental Response Compensation and Liability Act(CERCLA).

PB92-963340/REB PC A02/MF A01
Risk Assessment Guidance for Superfund. Volume 1. Human Health Evaluation Manual (Part C). Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Dec 91, 8p OSWER-9285.7-01CFS
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.

EPA's Human Health Evaluation Manual, which describes the process of gathering information and assessing the risk to human health, and the Environment Evaluation Manual comprise a two-volume set called Risk Assessment Guidance for Superfund (RAGS). The HHEM has three main parts: Part A, which discusses the baseline risk assessment, Part B, Development of Risk-based Preliminary Remediation Goals, and Part C, Risk Evaluation of Remedial Alternatives. The fact sheet is designed to introduce remedial project managers and other personnel to the information that is available in RAGS/HHEM Part C on using human health risk information to evaluate remedial alternatives.

Keywords: *Toxicity, *Hazardous materials, *Public health, *Pollution control, Project management, Sites, Evaluation, Environmental impacts, Humans, Exposure, Manuals, *Superfund, *Risk assessment, Remedial alternatives, CERCLA(Comprehensive Environmental Response), Compensation and Liability Act.

PB92-963342/REB PC A01/MF A01
Accessing the $50 Million Set-Aside in the Remedial Action Budget for Quick Response at National Priorities List Sites. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
20 Feb 92, 4p OSWER-9200.1-11
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The memorandum establishes the procedures required to access the $50 million that has been set aside from the FY92 Remedial Action budget for quick response at National Priorities sites.

Keywords: *Federal budgets, *Hazardous materials, *Directives, Requirements, Financing, Response, *Superfund, National Priorities List, *Remedial action, Cleanup.

PB92-963343/REB PC A01/MF A01
Authorization for Regional Administrators to Approve Consistency Exemptions at NPL Sites. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
24 Feb 92, 3p OSWER-9360.2-04
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 purpose of the directive is to provide Regional Administrators with limited authority to approve exemptions from the $2,000,000 statutory limit on CERCLA removal actions. This authority is limited to consistency exemptions at proposed and final National Priorities List (NPL) sites.

Keywords: *Authorizations, *Administrative personnel, *Hazardous materials, *Directives, Removal, Statutes, Authority, Sites, Guidelines, *Superfund, CERCLA(Comprehensive Environmental Response Compensation and Liability Act), *National Priorities List.

PB92-963344/REB PC A01/MF A01
Update No. 2 to 'Procedures for Completion and Deletion of NPL Sites'. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
19 Feb 92, 5p OSWER-9320.2-3C
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 purpose of the directive is to revise EPA guidance to clarify the distinction between the terms 'site completion' and 'construction completion.'

Keywords: *Hazardous materials, *Pollution control, Instructions, Sites, Reporting, *Superfund, National Priorities List.

PB92-963345/REB PC A01/MF A01
Guide to Principal Threat and Low Level Threat Wastes. Fact sheet.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Nov 91, 4p OSWER-9380.3-06FS
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 National Oil and Hazardous Substances Pollution Contingency Plan states that the EPA expects to use 'treatment to address the principal threats posed by a site, wherever practicable' and 'engineering controls, such as containment, for waste that poses a relatively low long-term threat.' The guide explains considerations that should be taken into account in categorizing waste for which treatment or containment generally will be suitable and provides definitions, examples, and ROD documentation requirements related to waste that constitute a principal or low level threat.

Keywords: *Hazardous materials, *Waste treatment, *Pollution control, Guidelines, Containment, Sites, Identifying, Wastes, Exposure, Contamination, Protection, Humans, Public health, Toxicity, Requirements, *Superfund, *Low level threat, Long term threat, Record of Decision.

PB92-963402/REB PC A02/MF A01
CERCLA Reporting Requirements for Releases of Ethylene Glycol from Airplane De-Icing Operations. Directive.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
4 Feb 92, 6p OSWER-9360.4-12
Paper copy available on Standing Order, deposit account required (minimum deposit $200 U.S., Canada, and Mexico; all others $400). Single copies also available in paper copy or microfiche.

The directive provides the interpretation of the U.S. Environmental Protection Agency with respect to reporting requirements under section 103(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for ethylene glycol releases that occur in connection with airplane de-icing operations. Specifically, the directive sets forth the Agency's position on the applicability of the federally permitted release exemption and the continuous release reporting regulation to releases of ethylene glycol from airplane de-icing operations.

Keywords: *Aircraft, *Deicers, *Hazardous materials, *Air pollution, Ethylene glycol, Regulations, Reporting, Releasing, *Superfund, Comprehensive Environmental Response Compensation and Liability Act(CERCLA).

PB92-963701/REB PC A11/MF A03
Superfund Record of Decision (EPA Region 1): Western Sand and Gravel Site, Burrillville and North Smithfield, RI. (Third Remedial Action), April 1991.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
16 Apr 91, 245p EPA/ROD/R01-91/055
See also PB85-213643.
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The 20-acre Western Sand & Gravel site is a former liquid waste disposal site on the boundary of Burrillville and North Smithfield, Rhode Island. Land use in the area is primarily semi-rural. From 1975 to 1979, approximately 12 acres of the site were used for the disposal of liquid wastes including hazardous substances and sewage. These wastes were dumped into 12 unlined lagoons and pits, and subsequently infiltrated through the porous soil and into the ground water. In 1980 at the request of the State, EPA removed approximately 60,000 gallons of VOC-contaminated liquid wastes from the lagoons. Remedial activities for the site have been divided into three operable units (OUs), addressed by three Records of Decision. The selected remedial action for the site includes natural attenuation of ground water; implementing a site monitoring program for sediment, ground water, and surface water; and implementing institutional controls to restrict consumption of ground water. However, if the cleanup is proceeding at an unacceptable rate, active restoration including pumping and treatment by sedimentation, filtration, air stripping, and carbon adsorption will be implemented.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Metals, Arsenic, Chromium, National government, State government, Cost analysis, Lead(Metal), Pumping, Filtration, Waste treatment, Activated carbon treatment, *Superfund, *Cleanup, Record of Decision, Third Remedial Action, Volatile organic compounds, Air stripping.

PB92-963702/REB PC A13/MF A03
Superfund Record of Decision (EPA Region 1): Dover Municipal Landfill, Dover, NH. (First Remedial Action), September 1991. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
10 Sep 91, 290p EPA/ROD/R01-91/062
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The 55-acre Dover Municipal Landfill site is an inactive landfill in Dover, Strafford County, New Hampshire. Land use in the area is rural-residential and recreational. The site overlies both an upper and a lower aquifer that are separated by impermeable clay. In 1981, VOC contamination was found in private residential wells screened in the upper aquifer in the vicinity of the landfill. Further analyses identified two contaminant plumes, one migrating to the south and the other

moving to the east. The Record of Decision (ROD) addresses both source control and management of migration of contaminated ground water, as a final remedy. The primary contaminants of concern affecting the soil, sediment, sludge, debris, and ground water are VOCs including benzene, PCE, TCE, toluene and vinyl chloride; other organics; and metals including arsenic. The selected remedial action for the site includes excavating and consolidating approximately 300 cubic yards of sediment from the drainage channel, and depositing the material into the landfill prior to capping; recontouring and capping the landfill; ground water pumping and onsite treatment of ground water and leachate using aeration for VOC removal.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Earth fills, Metals, Excavation, National government, State government, Cost analysis, Vinyl chloride, Capping, Sediments, Flocculating, Coagulation, Venting, *Superfund, *First Remedial Action, *Cleanup, *Dover(New Hampshire), Record of Decision, Volatile organic compounds.

PB92-963901/REB PC A06/MF A02
Superfund Record of Decision (EPA Region 2): C and J Disposal Site, Town of Eaton, Madison County, NY. (First Remedial Action), March 1991. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Mar 91, 110p EPA/ROD/R02-91/134
Portions of this document are not fully legible.
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The C and J Disposal site is a former industrial waste disposal area in the Town of Eaton, Madison County, New York. Located 3,000 feet to the south of the site, Woodman Pond serves as a backup drinking water source for the nearby Village of Hamilton. The primary contaminants of concern affecting the soil and debris are VOCs including benzene, toluene, TCE, and xylenes; other organics including PAHs and phenols; and metals including lead. The selected remedial action for the site includes dewatering the trench and treating the water before recharge, if necessary; excavating approximately 1,250 cubic yards of contaminated soil and debris from the disposal trench, followed by offsite treatment or disposal.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Phenols, Metals, Excavation, National government, State government, Cost analysis, Lead(Metal), Dewatering, Waste treatment, Soils, Removal, Ground water, *Superfund, Record of Decision, First Remedial Action, *Cleanup, Volatile organic compounds, Eaton(New York).

PB92-963902/REB PC A04/MF A01
Superfund Record of Decision (EPA Region 2): Endicott Village Wellfield, Broome County, Endicott, NY. (Second Remedial Action), March 1991.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Mar 91, 71p EPA/ROD/R02-91/137
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, andMexico; for all others $400. Also available individually in paper copy or microfiche.

The Endicott Village Well Field site consists of a municipal well, the Ranney Well, and its zone of influence, and is located in Endicott, Broome County, New York. Ground water pumped from the well serves as the primary drinking water source for the area. Land use in the area of concern includes a golf course, a sewage treatment plant, an airport, a few industrial tracts, two inactive landfills, and the Endicott Landfill. A 1987 Record of Decision (ROD) provided for installation of a packed column air stripper to treat water from the Ranney Well. In 1988, EPA identified the landfilled materials in the Endicott Landfill as the probable source of ground water contamination. The primary contaminants of concern affecting the ground water are VOCs including benzene, PCE, and TCE. The selected remedial action for this site includes upgrading the existing purge well system by installing an additional purge well between the landfill and the Ranney Well; pumping ground water from the purge well and discharging the water onsite to the sewage treatment plant, or treating the water prior to discharge and monitoring purge well water. The estimated present worth cost for this remedial action, assuming that no treatment will be required is $376,000.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Earth fills, Municipal wastes, National government, State government, Cost analysis, Water wells, Water treatment, Strippers, Monitoring, Benzene, Ground water, *Superfund, Record of Decision, Second Remedial Action, *Cleanup, Volatile organic compounds, *Broome County(New York), Ethylene/Trichloro.

PB92-963903/REB PC A05/MF A01
Superfund Record of Decision (EPA Region 2): Genzale Plating Company, Franklin Square, Nassau County, NY. (First Remedial Action), March 1991.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
29 Mar 91, 79p EPA/ROD/R02-91/142
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The Genzale Plating site is an electroplating facility, which occupies a 24,000-square-foot area in Franklin Square, Nassau County, New York. Land use in the area is predominantly residential, with a wetlands area located approximately 3 miles southeast of the site. The site overlies a Class II aquifer, which is tapped by three water supply wells within 1.5 miles of the site. Testing of the wastewater samples from the pits indicated heavy metal concentrations in excess of State discharge standards. The primary contaminants of concern affecting the soil and ground water are VOCs including PCE and TCE; other organics including PAHs; and metals including arsenic, chromium, and lead. The selected interim remedial action for this site includes treating soil using in-situ vacuum extraction and vapor phase carbon adsorption to control emissions followed by excavating 1,600 cubic yards of the treated soil and 480 cubic yards of topsoil and material from the leaching pits.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Soils, Metals, Excavation, National government, State government, Cost analysis, Electroplating, Arsenic, Chromium, Vacuum pumps, Waste treatment, Removal, *Superfund, *First Remedial Action, *Cleanup, Record of Decision, Volatile organic compounds, Air stripping.

PB92-963904/REB PC A08/MF A02
Superfund Record of Decision (EPA Region 2): Global Landfill, Middlesex County, NJ. (First Remedial Action), October 1991.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 91, 168p EPA/ROD/R02-91/147
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The 57.5-acre Global Landfill is an inactive solid waste disposal facility in Old Bridge Township, Middlesex County, New Jersey. Land use in the area is primarily residential. Onsite features include a 51-acre landfill, a 6.5-acre northwest landfill extension, and an inactive 1.7-acre leachate collection pond. From 1988 to 1991, EPA and State site investigations identified 63 buried 55-gallon drums containing hazardous wastes including VOCs, organics, and metals within both the waste mound and northwest extension. The Record of Decision (ROD) addresses Operable Unit 1 (OU1), the landfill wastes. The primary contaminants of concern affecting the soil and sediment are VOCs including benzene, PCE, TCE, toluene, and xylenes; other organics; and metals including arsenic, chromium, and lead. The selected remedial action for the site includes capping the landfill with a synthetic and clay cap; constructing a soil stabilization berm; constructing and operating a gas management system, and stormwater and leachate collection systems; pumping leachate and condensate from the gas collection system to a holding tank, and subsequently transporting the waste offsite for treatment and disposal.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Earth fills, Metals, Excavation, National government, State government, Cost analysis, Soils, Capping, Benzene, Waste treatment, Methane, *Superfund, *First Remedial Action, *Cleanup, *Middlesex County, New Jersey, Record of Decision, Volatile organic compounds.

PB92-963901/REB PC A04/MF A01
Superfund Record of Decision (EPA Region 3): Mid-Atlantic Wood Preservers, Harmans, Anne Arundel County, MD. (First Remedial Action), December 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Dec 90, 70p EPA/ROD/R03-91/106
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The 3-acre Mid-Atlantic Wood Preservers (MAWP) site is a wood treatment facility in Harmans, Anne Arundel County, Maryland. Since 1974, the facility has been used for pressure treatment of lumber using chromate copper arsenate (CCA) as the wood preservative. However, offsite investigations by EPA in 1983 identified elevated levels of arsenic and chromium in ground water. The selected remedial action for the site includes excavating and stabilizing approximately 20 cubic yards of onsite soil contaminated with arsenic levels greater than 1,000 mg/kg (referred to as hot spots), followed by offsite disposal; capping the remaining soil with arsenic concentrations between 10 mg/kg and 1,000 mg/kg with an asphalt/concrete cap; constructing an enlarged and roofed drip pad which is consistent with new wood treating regulations; allowing natural attenuation to lower chromium levels in ground water; monitoring sediment, ground water, surface water, and air; and implementing institutional controls including deed restrictions.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Wood preservatives, Arsenic, Excavation, National government, State government, Cost analysis, Chromium, Soils, Capping, Concentration(Compensation), Monitoring, Ground water, *Superfund, Record of Decision, *First Remedial Action Final, Volatile organic compounds, *Ann Arundel County(Maryland).

PB92-963902/REB PC A03/MF A01
Superfund Record of Decision (EPA Region 3): Publicker/Cuyahoga Wrecking Plant, PA. (Second Remedial Action), June 1991.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Jun 91, 33p EPA/ROD/R03-91/114
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The 37-acre Publicker/Cuyahoga Wrecking Plant site is a former liquor and industrial alcohol distillery in Philadelphia, Philadelphia County, Pennsylvania. From the 1970s to 1980s, the site was also used as a petroleum and chemical storage facility, which utilized 440 large above-ground tanks, stored chemicals, chemical laboratories, reaction vessels, production buildings, warehouses, a power plant, and several hundred miles of above-ground process lines, many of which were wrapped with asbestos insulation. The selected remedial action for the site includes removing approximately 150 cubic yards of asbestos from overhead extraction pipes and placing the material in plastic bags; staging the material, along with 6 cubic yards of asbestos from near a loading pier and 1,100 cubic yards of bagged asbestos from previous removal and remedial actions; and disposing of the staged asbestos offsite. The estimated present worth cost for the remedial action is $293,420.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Asbestos, Debris, Waste treat-

ment, National government, State government, Cost analysis, Removal, Insulation, Storage, Plastics, Pipes(Tubes), *Superfund, Record of Decision, Second Remedial Action, Philadelphia(Pennsylvania), *Philadelphia County(Pennsylvania).

PB92-963903/REB PC A04/MF A01
Superfund Record of Decision (EPA Region 3): Resin Disposal, Jefferson Borough, Allegheny County, PA. (First Remedial Action), June 1991.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
28 Jun 91, 52p EPA/ROD/R03-91/113
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The 26-acre Resin Disposal site is an inactive industrial landfill and former coal strip mining area in Jefferson Borough, Allegheny County, Pennsylvania. The site overlies a bedrock aquifer, a source of non-potable ground water. The Record of Decision (ROD) addresses source control, as well as preventing migration of contaminated ground water in the Pittsburgh Coal Formation. The primary contaminants of concern affecting soil, debris, and ground water are VOCs including benzene, toluene, and xylenes; and other organics including napthalene, PAHs and phenols. The selected remedial action for the site includes capping the landfill with a multi-layer cap, and upgrading the landfill dike; relocating a sanitary sewer; installing a new oil/water separator for leachate treatment, and implementing institutional controls, including deed restrictions. The estimated present worth cost for this remedial action is $4,348,000.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Earth fills, Phenols, Excavation, National government, State government, Cost analysis, Aromatic polycyclic hydrocarbons, Soils, Capping, Waste treatment, Separation, *Superfund, Record of Decision, *First Remedial Action, Volatile organic compounds, *Jefferson Borough(Pennsylvania).

PB92-963908/REB PC A05/MF A01
Superfund Record of Decision (EPA Region 3): Cryo-Chem Site, Earl Township, Berks County, PA. (Third Remedial Action), September 1991. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Sep 91, 85p EPA/ROD/R03-91/120
See also PB90-162678 and PB91-921502.
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The 19-acre Cryo-Chem site is a metal fabrication facility in Worman, Earl Township, Berks County, Pennsylvania. Land use in the area is semi-rural, with a woodland area located northeast of the site, and an onsite stream west of the contaminated area. Between 1970 and 1982, chemical solvents were used at the facility at a rate of two to three 55-gallon drums per year. EPA has divided the site into three operable units (OUs) for remediation. The ROD addresses contamination in soil caused by past facility operations, which continues to leach from the soil into the ground water system. The primary contaminants of concern affecting the soil are VOCs including DCA, and PCE, TCA, and TCE. The selected remedial action for this site includes sampling the area to better define the extent of the contamination; treating the contaminated soil onsite using vapor extraction; controlling air emissions using carbon absorption, and disposing of, or regenerating, any spent carbon; discharging any water captured during in-situ vapor extraction to the pump and treat system currently under design. The estimated present worth cost for the remedial action ranges from $53,500 to $66,400 based on the treatment selected.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Soils, Ground water, National government, State government, Cost analysis, Waste treatment, Air pollution control, Absorption, Activated carbon treatment, *Superfund, *Berks County(Pennsylvania), Record of Decision, Third Remedial Action, Volatile organic compounds, Vapor extraction.

PB92-964001/REB PC A03/MF A01
Superfund Record of Decision (EPA Region 4): Hercules 009 Landfill Site, Brunswick, Glynn County, GA. (First Remedial Action), June 1991.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
27 Jun 91, 23p EPA/ROD/R04-91/089
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The 16.5-acre Hercules 009 Landfill site is in Brunswick, Glynn County, Georgia. Land use in the area is predominantly commercial and residential. Onsite features in the northern 7 acres of the site are a landfill area with 6 disposal cells containing approximately 33,000 cubic yards of 1 percent toxaphene sludge, a drainage ditch, and a drainage culvert. From 1948 to 1980, Hercules Inc., manufactured the agricultural pesticide toxaphene. Also disposed of in the landfill area were empty toxaphene product drums, process sludges, glass, rubble, and trash. In 1983, the State required Hercules to install a ground water monitoring system to assess site contamination. In 1984, because toxaphene was found in a deep/shallow well cluster in the aquifer beneath the site, additional ground water monitoring wells were installed. Hercules closed, covered, and seeded all landfill cells in accordance with State solid waste permits. The selected remedial action for this interim remedy includes extending municipal water lines and connecting all residences with private wells and the church to the municipal water supply; and implementing institutional controls, including ground water use restrictions.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Pesticides, Toxaphene, National government, State government, Cost analysis, Ground water, Monitoring, Water supply, Municipalities, Water wells, Water pipelines, *Superfund, *First Remedial Action, *Cleanup, *Glynn County(Georgia), Record of Decision, Volatile organic compounds.

PB92-964101/REB PC A05/MF A02
Superfund Record of Decision (EPA Region 5): Acme Solvent Reclaiming, Winnebago County, IL. (Second Remedial Action), December 1990.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
31 Dec 90, 97p EPA/ROD/R05-91/168
See also PB86-133881.
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The 20-acre Acme Solvent Reclaiming site is a former industrial disposal site in Winnebago County, Illinois. Land use in the area is mixed agricultural and residential. From 1960 to 1973, Acme Solvent Reclaiming disposed of paints, oils, and still bottoms onsite from its solvent reclamation plant. Wastes were dumped into depressions created from previous quarrying and landscaping operations, and empty drums also were stored onsite. State investigations in 1981 identified elevated levels of chlorinated organic compounds in ground water. A 1985 Record of Decision (ROD) provided for excavation and onsite incineration of 26,000 cubic yards of contaminated soil and sludge, supplying home carbon treatment units to affected residences, and further study of ground water and bedrock. During illegal removal actions taken by PRPs in 1986, 40,000 tons of soil and sludge were removed from the site. The selected remedial action for the site includes excavating and treating 6,000 tons of soil and sludge from two waste areas, using low-temperature thermal stripping; treating residuals using solidification, if necessary, followed by onsite or offsite disposal; treating the remaining contaminated soil and possibly bedrock using soil/bedrock vapor extraction; consolidating the remaining contaminated soil onsite with any treatment residuals, followed by capping; incinerating offsite 8,000 gallons of liquids and sludge from two remaining tanks, and disposing of the tanks offsite; providing an alternate water supply to residents with contaminated wells; pumping and onsite treatment of VOC-contaminated ground water.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Soils, Metals, Excavation, National government, State government, Cost analysis, Sludge, Waste treatment, Chlorinated hydrocarbons, Incineration, Pumping, Water treatment, *Superfund, Record of Decision, *Second Remedial Action, Volatile organic compounds.

PB92-964102/REB PC A04/MF A01
Superfund Record of Decision (EPA Region 5): Oak Grove Sanitary Landfill, Anoka County, MN. (Second Remedial Action), December 1990. Final rept.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
21 Dec 90, 68p EPA/ROD/R05-91/153
See also PB89-183883.Portions of this document are not fully legible.
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The 45-acre Oak Grove Sanitary Landfill is a former municipal and industrial solid waste landfill in Oak Grove Township, Anoka County, Minnesota. A 1988 Record of Decision (ROD) addressed the sources of contamination by containing the onsite waste and contaminated soil with a cover. EPA investigations in 1989 determined that the contaminated shallow aquifer discharges directly to the surface water of the adjoining wetlands where ground water contamination is being reduced by natural attenuation, and thus, limiting migration of contaminants to the surface water. The selected remedial action for the site includes long term monitoring of the shallow and deep aquifers, surface water, and sediment at a frequency of three times per year for the first year and semi-annually thereafter; natural attenuation of shallow ground water; abandoning non-essential wells; and implementing institutional controls including ground water use restrictions.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Earthfills, Metals, Excavation, National government, State government, Cost analysis, Solvents, Chlorine organic compounds, Soils, Capping, Aquifers, Monitoring, *Superfund, Record of Decision, Second Remedial Action Final, *Cleanup, Volatile organic compounds, *Anoka County(Minnesota).

PB92-964103/REB PC A04/MF A01
Superfund Record of Decision (EPA Region 5): Organic Chemicals, Grandville, MI. (First Remedial Action), September 1991.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Sep 91, 66p EPA/ROD/R05-91/173
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The 5-acre Organic Chemicals site is an inactive solvent reclamation and chemicals manufacturing facility in Grandville, Kent County, Michigan. The site includes several onsite buildings, structures, above-ground storage tanks and drum storage areas, a boiler facility, a wastewater treatment facility, and a seepage lagoon. Wetlands potentially are located 1,900 feet northwest of the site, and the Grand River is located 0.95 miles to the north of the site. In 1980, discharges to the lagoon ceased, and the company installed a wastewater pretreatment system, which discharged wastes to the sanitary sewer system. Subsequently, in 1981, the seepage lagoon sludge was excavated and disposed of offsite. The selected remedial action for the site includes onsite pumping and treatment of ground water using a treatment system consisting of an equalization/sedimentation basin, two granular activated carbon vessels, and an air stripper polishing unit; discharging the treated water onsite to the Grand River; and disposing of treatment carbon residuals in an offsite landfill.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Solvents, Pesticides, Excavation, National government, State government, Cost analysis, Benzene, Industrial waste treatment, Tolu-

ene, Pumping, Activated carbon treatment, Earth fills, *Superfund, Record of Decision, *First Remedial Action, Volatile organic compounds, *Grandville(Michigan), Air stripping.

PB92-964601/REB PC A07/MF A02
Superfund Record of Decision (EPA Region 10): Bunker Hill Mining and Metallurgical Complex, Shoshone County, ID. (First Remedial Action), August 1991.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
30 Aug 91, 136p EPA/ROD/R10-91/028
Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available individually in paper copy or microfiche.

The Bunker Hill Mining and Metallurgical Complex site is a 21 square-mile area centered around an inactive industrial mining and smelting site, and includes the cities of Kellogg, Smelterville, Wardner, Pinehurst, and Page, in Shoshone County, Idaho. The inactive industrial complex includes the Bunker Hill mine and mill, a lead smelter, a zinc smelter and a phosphoric acid fertilizer plant, all totalling several hundred acres. Initially, most of the solid and liquid residue from the complex was discharged into the river. When the river flooded, these materials were deposited onto the valley floor, and have leached into onsite soil and ground water. The selected remedial action for the site includes soil sampling; excavating contaminated soil and sod exceeding 1,000 mg/kg lead on approximately 1,800 residential properties, and replacing it with clean soil and sod; disposing of the contaminated soil and sod at an onsite repository; and capping the repository.

Keywords: *Hazardous materials, *Pollution control, *Waste disposal, Sites, Describing, Industrial wastes, Volume, Contaminants, Mining, Metals, Excavation, National government, State government, Cost analysis, Soils, Lead(Metal), Waste disposal, Capping, Monitoring, Ground water, *Superfund, Record of Decision, First Remedial Action, *Cleanup, *Shoshone County(Idaho).

DE92004878/REB PC A12/MF A03
Compendium of CERCLA ARARs fact sheets and directives.
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Oct 91, 254p CERCLA-005/1091

Section 121 (d) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), requires attainment of Federal and State applicable and relevant and appropriate requirements (ARARs). Subparts E, Section 300.400(g) "Identification of applicable or relevant and appropriate requirements" of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (55 CFR 8666, March 8, 1990) describes the process for attaining ARARs. The purpose of this compendium is to provide you with a complete and current source of "Quick Reference Fact Sheets" and Directives on applicable and relevant and appropriate requirements (ARARs). These fact sheets provide overviews of the ARARs for CERCLA cleanup actions. The Compendium of CERCLA ARARs consists of seven (7) chapters: lists of general fact sheets that provide introductory information on ARARs; Chapter 2 discusses air emissions from Superfund air strippers; Chapter 3 deals with Indian Tribal involvement in the Superfund program; Chapter 4 discusses soil lead cleanup levels at Superfund sites; Chapter 5 discusses the risk associated with Superfund cleanups; Chapter 6 contains four sections that discuss a variety of RCRA ARARs such as general guidance topics, land disposal restrictions, Superfund LDR guides, and toxicity characteristics; and finally, Chapter 7 contains a variety of ARAR fact sheets and directives on Wastewater, Safe Drinking Water Act and Groundwater.

Keywords: National Government, *Pollution Laws, State Government, *US Superfund, Compliance, Manuals, *Remedial Action, Risk Assessment, US DOE, US EPA, *Waste Management, EDB/293000, EDB/290300, Water pollution control, Air pollution control.

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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	**GLOBAL ASPECTS**
Title	Sensitivity of Ecological Landscapes and Regions to Global Climatic Change
NTIS Order Number/Media Code Price Codes	PB90-120072/HSU PC A09/MF A01

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NTIS Order Number/Media Code Price Codes	PB90-120072/HSU PC A09/MF A01
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PB92-140243/REB PC A11/MF A03

USDA/BLA-109
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13. /REB									
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15. /REB									
16. /REB									
17. /REB									
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