

Fiscal Year 2001
Agency Profile
and Annual Report

*The Agency for Toxic Substances
and Disease Registry*

October 1, 2000, to September 30, 2001

Disclaimer

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Foreword

The Agency for Toxic Substances and Disease Registry (ATSDR) is pleased to present this report of the agency's principal works and findings from fiscal year 2001. Collectively, ATSDR annual reports provide a historical record of significant accomplishments under the Comprehensive Environmental Response, Compensation, and Liability Act (also known as the Superfund statute), as amended, and other federal statutes.

This annual report highlights the accomplishments of fiscal year 2001 in sufficient detail for the reader to appreciate the wide breadth of ATSDR's programs and the advances in public health that occurred during the year.

The employees of the agency take great pride in its accomplishments and the contributions that the agency made in fiscal year 2001 toward improving public health and environmental protection. Comments from interested readers are always welcome.

Executive Summary

The Agency for Toxic Substances and Disease Registry (ATSDR) is the lead public health agency responsible for implementing the health-related provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, also known as Superfund). ATSDR's primary goals are

- to identify people at health risk because of their exposure to uncontrolled hazardous substances in the environment
- to evaluate relationships between hazardous substances in the environment and adverse human health outcomes
- to intervene to eliminate exposure of health concern and reduce or prevent harmful health effects related to releases of hazardous substances in the environment.

Report Highlights

This report highlights ATSDR's accomplishments and the activities that were conducted in fiscal year 2001. There is a chapter devoted to each of the agency's goals. Those programs the agency uses to meet its goals, some key findings, and examples of activities from fiscal year 2001 are summarized in the following paragraphs.

Identifying People Who Are Exposed to Hazardous Substances

ATSDR's health assessment activities help (1) identify people who may have been exposed to hazardous substances in the environment and

(2) determine whether these people might be at risk of adverse health effects as a result of that exposure. During fiscal year 2001, ATSDR and the states that have cooperative agreements with ATSDR performed more than 1,800 health assessment activities. These activities included health assessments, health consultations, exposure investigations, and other activities that were conducted in 44 states, Puerto Rico, the U.S. Virgin Islands, Guam, the Navajo Nation, and Saipan.

ATSDR analyzed demographic data for 196 sites where health assessments or health consultations were conducted in fiscal year 2001. Approximately 2.1 million people lived within a mile of those sites. Of those, about 11% were children aged 6 years or younger, and about 26% were under 18. About 22% were women of childbearing age. About 11% were elderly, aged 65 or older.

Site Example – Fountain Inn/ Simpsonville South Carolina

An example of a site ATSDR assisted in fiscal year 2001 was the communities of Fountain Inn, South Carolina, and Simpsonville, South Carolina, which were found to have high levels of uranium in well water. The average concentrations were 17 times EPA's maximum contaminant level of 30 micrograms per liter. In April 2001, ATSDR, in conjunction with its cooperative agreement partner, the South Carolina Department of Health and Environmental Control, conducted an exposure investigation to assess and better characterize human exposure

to uranium from well water in the affected area. Urine samples for 105 residents were tested for uranium 1 to 3 months after the residents had stopped drinking well water. The concentration of uranium in urine samples from 94 (90%) of the residents exceeded the 90th percentile of the national comparison population. A follow-up exposure study is planned.

ATSDR notified the participants and, if requested, their personal physicians about the test results. ATSDR and state health department physicians were available for consultation with personal physicians about their patients' test results and follow-up medical management. ATSDR and state health department staff developed informational materials for distribution to the local medical community. Municipal water lines are being installed to serve the area. Residents have been supplied with an alternative water source while the municipal lines are under construction.

National Emergency Response

As part of its goal to identify people who may be exposed to hazardous substances, ATSDR provides emergency response services, including a response line that offers technical assistance to federal, state, and local responders during emergencies that involve the spills of hazardous substances. During the weeks following the September 11 attacks on the World Trade Center and the Pentagon, ATSDR worked with other federal agencies, state and local health departments, and other organizations to respond to the enormous challenges of the tragedy. ATSDR staff members assisted the response effort in a variety of ways—including mapping sampling locations, helping to develop screening guidelines for asbestos and other hazardous substances, sampling dust in Manhattan residences, and speaking with groups of busi-

ness owners, residents, rescue workers, and others in New York to answer their health questions.

Evaluating Relationships Between Hazardous Substances and Health: Toxicologic Research

One of the ways ATSDR evaluates the relationships between hazardous substances in the environment and human health outcomes is through toxicologic research. ATSDR's toxicologic research program is filling many data gaps about how hazardous substances affect human health. ATSDR oversees two major research programs designed to help fill these data gaps—the ATSDR Great Lakes Human Health Effects Research Program and the ATSDR Minority Health Professions Foundation Research Program.

ATSDR's toxicologic research provides critical information to public health decision makers about the health effects of hazardous substances. For example, findings from ATSDR's Great Lakes Human Health Effects Research Program have been published in an International Joint Commission report on the priorities and progress made under the Great Lakes Water Quality Agreement. During fiscal year 2001, researchers supported by the Great Lakes research program reported findings from their study of the relationship between maternal consumption of contaminated fish and infants' birth weight. Children born to mothers who consumed more than 116 fish meals before their pregnancy were more than five times more likely to have low birth weight.

ATSDR toxicological profiles provide information about the relationship between hazardous substances and health outcomes. These profiles summarize information about many of the most

hazardous substances found at Superfund sites. As of fiscal year 2001, ATSDR has published 159 toxicological profiles covering about 800 substances.

During fiscal year 2001, ATSDR made significant progress in filling the priority data needs that have been identified for 50 hazardous substances. During fiscal year 2001, ATSDR re-evaluated the current exposure and toxicity information for the 50 substances, identifying 190 distinct priority data needs. To date, 101 priority data needs are being addressed via the mechanisms that ATSDR has implemented, and 62 of these have been filled.

Evaluating Relationships Between Hazardous Substances and Health: Conducting Health Studies

ATSDR conducts and supports health studies to evaluate the relationship between exposure to hazardous substances and adverse health effects. ATSDR also conducts studies to evaluate how people become exposed to hazardous substances.

ATSDR continued its work evaluating residents and former residents of Libby, Montana, during fiscal year 2001. Vermiculite mined in the area was found to have been contaminated with asbestos, and people had been potentially exposed for a number of years. ATSDR conducted a medical screening program to evaluate the health of Libby residents and former residents. The testing included an interview, chest x-ray, and a spirometry test of lung function. The program screened more than 7,000 people and provided them with health status information and any needed referrals.

About 1,000 of 5,590 participants (18%) who were x-rayed between July and November 2000 had pleural abnormalities. The risk of pleural

abnormalities was greatest for former vermiculite workers, females in workers' households, and for people who had recreational exposures to vermiculite. ATSDR also analyzed Libby's mortality statistics for 1979—1998 and found the death rate for asbestosis was 40 to 60 times higher than expected, as compared to rates in Montana and in the entire United States, respectively.

ATSDR has collaborated with other agencies of the Department of Health and Human Services to have additional medical services provided in Libby. During 2001, the Health Resources and Services Administration's Bureau of Primary Health Care awarded a grant to establish a clinic in Lincoln County. The clinic began operation on December 31, 2001.

Preventing Health Effects Related to Hazardous Substances

ATSDR draws on its resources in health education, risk communication, environmental medicine, and health promotion to prevent or reduce the harmful health effects of exposure to hazardous substances in communities. ATSDR provides such preventive measures as training local physicians about the health concerns associated with contaminants, providing communities with information about the health effects of hazardous substances, and providing clinical evaluations and screenings. ATSDR also conducts health education and promotion activities that have a nationwide focus, such as its case study program on environmental medicine.

These activities are conducted with the assistance of numerous partners with whom the agency has cooperative agreements, including states, American Indian tribal nations or groups, and national organizations. ATSDR, in cooperation with its state partners, performed health education activities at approximately 310 sites

this year. ATSDR expanded its network of Pediatric Environmental Health Specialty Units (PEHSUs) in fiscal year 2001 to 11 operating units.

ATSDR expanded its community stress program during fiscal year 2001. The program provides assistance to communities and training to state and local health care providers and health officials on issues relating to the stress that communities experience concerning hazardous substances. For example, ATSDR, in partnership with the Pennsylvania Department of Health and local mental health personnel in Hazleton, has mounted a response to the significant stress in the community affected by the Tranguch gasoline spill. Efforts have focused on community education, workshops on community stress for local health care professionals, and support for the community-created Behavioral Healthcare Response team. In addition, a counseling hotline was established for residents.

Fiscal Year 2001 Initiatives

During fiscal year 2001, ATSDR completed or neared completion of several major tasks aimed at taking a long-range view of the agency's public health activities. Specifically, ATSDR completed its research agenda, developed a joint vision for environmental public health with the National Center for Environmental Health, and neared completion of a new 5-year strategic plan.

Agency Profile

History of ATSDR

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal agency that Congress created through the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), commonly referred to as the Superfund legislation.

Congress enacted Superfund as part of its

response to two highly publicized and catastrophic events: discovery of the Love Canal hazardous waste site in Niagara Falls, New York, and an industrial fire in Elizabethtown, New Jersey, that released highly toxic fumes into a densely populated area. Congress created ATSDR to implement the health-related sections of laws that protect the public from hazardous wastes and uncontrolled releases of hazardous substances into the environment.

In 1983, an administrative order of the Secretary of the U.S. Department of Health and Human Services (DHHS) established ATSDR as a separate agency of the Public Health Service. In June 1985, ATSDR was formally organized to begin to implement provisions of CERCLA. ATSDR was to work in concert with the

Environmental Protection Agency (EPA), the Centers for Disease Control (CDC, now the Centers for Disease Control and Prevention), and the National Institute of Environmental Health Sciences.

When Congress reauthorized Superfund in 1986 in the Superfund Amendments and Reauthorization Act (SARA), ATSDR received

major new mandates. By August 1989, the agency had assumed its current structure. Since 1989, ATSDR has received additional non-CERCLA statutory responsibilities. The agency is headquartered in Atlanta, Georgia. The agency is staffed by more than 400 health professionals and other staff members who work in Atlanta, in the agency's

Washington office, and in ten EPA regional offices throughout the country.



Mission of the Agency

ATSDR's mission is to prevent exposure and adverse human health effects and diminished quality of life associated with exposure to hazardous substances from waste sites, unplanned releases, and other sources of pollution. ATSDR works closely with state, local, and other federal

Trichloroethylene (TCE) Subregistry, National Exposure Registry

Agency for Toxic Substances
and Disease Registry

"Our objective is to describe a TCE-exposed population and the results of comparing health outcome reporting rates in the TCE Subregistry with a national sample."

BACKGROUND

There are specific procedures for establishing a subregistry. The primary criteria for site selection consist of:

- documented contamination of media (water or soil),
- known levels of contamination,
- existence of complete exposure pathway,
- defined length or duration of exposure, and
- sufficient size of the potentially exposed population.

To be eligible for the NER, potential registrants had to meet the following criteria:

- Lived at an address in one of the exposure sites for at least 30 consecutive days during the defined exposure period, and
- were exposed to the contaminated media (in the TCE Subregistry, registrants were exposed to contaminated well water).

DATA COLLECTION

Baseline interviews were conducted face-to-face by trained interviewers using a hard copy instrument. Follow-up interviews were conducted using a CATI (Computer-Assisted Telephone Interview) System. The first follow-up occurred one year after baseline; subsequent follow-ups were conducted at two-year intervals.

Types of data collected:

- demographic (age, race, sex),
- lifestyle (occupational history, education),
- residential history (Baseline only),
- health status,
- tobacco use, and
- reproductive history.

Health status data are collected at all time points for 25 conditions and symptoms.



Facts about the Trichloroethylene (TCE) Subregistry:

- Established in 1989
- 14 sites in 5 states (MI, IN, IL, PA, AZ)
- 4,986 registrants (living and deceased)
- Exposure time periods range from 6.5 years to 33 years
- Number of households per site range from 3 to 331
- Number of environmental samples per site range from 5 to 390
- Median TCE levels in well water range from 0.4 ppb to 234.0 ppb



For more information on the National Exposure Registry please visit: WWW.ATSDR.CDC.GOV/NER

ATSDR
Agency for Toxic Substances and Disease Registry

agencies to reduce or eliminate harmful health effects that are related to exposure to toxic substances at waste disposal and spill sites.

As the lead public health agency responsible for implementing the health-related provisions of CERCLA, ATSDR is charged with assessing health hazards at specific Superfund sites, helping to prevent or reduce exposure and the illnesses that result, and increasing knowledge and understanding of the health effects that may result from exposure to hazardous substances.

CERCLA mandated that ATSDR (1) establish a National Exposure and Disease Registry; (2) create an inventory of health information on hazardous substances; (3) create a list of sites that had been closed or had access restricted because of toxic contamination; (4) provide medical assistance during hazardous substance emergencies; and (5) determine the relationship between hazardous substance exposure and illness.

The Resource Conservation and Recovery Act (RCRA), as amended in 1984, mandated that ATSDR work with EPA to (1) identify new hazardous wastes to be regulated; (2) conduct health assessments at RCRA sites at EPA's request; and (3) consider petitions by states or members of the public to conduct health assessments at sites.

SARA broadened ATSDR's responsibilities, giving ATSDR mandates to conduct public health assessments, establish and maintain toxicologic databases, disseminate information, and provide medical education in the areas of public health assessments, establishment and maintenance of toxicologic databases, information dissemination, and medical education. The Great Lakes Critical Programs Act of 1990 required EPA, in cooperation with ATSDR, to report to Congress on the adverse health effects of water pollutants on people, fish, shellfish, and wildlife.

Priorities for the Future

During fiscal year 2001, ATSDR completed or neared completion of several major tasks aimed at taking a long-range view of the agency's public health activities. Specifically, ATSDR completed its research agenda, developed a joint vision for environmental public health with the National Center for Environmental Health, and neared completion of a new 5-year strategic plan.

The research agenda, Agenda for Public Health Environmental Research (APHER) 2002–2010, is helping to guide ATSDR's research programs through the first decade of the new millennium. The research agenda was approved by the ATSDR Board of Scientific Counselors in December 2000. The research projects proposed in the agenda focus on six areas: exposure assessment, chemical mixtures, susceptible populations, communities and tribal development, evaluation and surveillance of health effects, and health promotion and intervention.

Results of research in these areas will improve ATSDR public health activities and interventions for communities exposed to hazardous substances through contaminated water, soil, air, or food. Research in each area will improve the tools, methods, and approaches used to evaluate and prevent exposure and adverse health outcomes. The agenda will facilitate planning and communication and foster collaboration on crosscutting areas of research.

The research efforts will benefit numerous communities in the United States and around the world as the research findings are incorporated into more effective environmental public health practice. The agenda will be updated over time to monitor priorities and resources. ATSDR is also working closely with the National Institute of Environmental Health Sciences, CDC, and

other agencies in coordinating research agendas and identifying important areas for collaborative research.

In FY 2001, APHER funds supported three research projects. These projects are as follows:

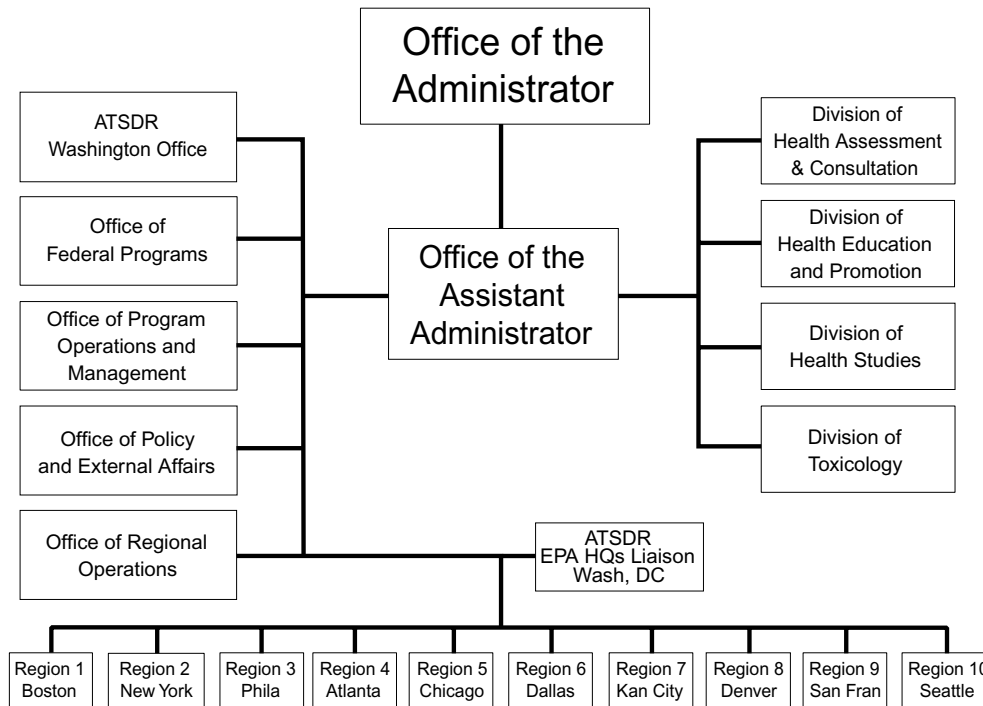
- an evaluation of psychosocial stress levels in children who live in communities affected by hazardous substances,
- a feasibility study for examining the long-term health consequences of exposure to trichloroethylene in drinking water in Beaverton, Oregon, and
- a study examining thimerosal pharmacokinetics: assessment of distribution, metabolism, and excretion.

Also during fiscal year 2001, ATSDR and the National Center for Environmental Health (NCEH) developed a vision statement outlining a model environmental health program. A CDC/ATSDR Working Group drafted a report on a shared vision that aims to establish common ground on which to build ATSDR and NCEH programs that would become national and international resources for addressing environmental public health threats and promoting health by improving the environment. The vision document calls for greater coordination and collaboration between the two environmental health agencies.

The shared vision has four key elements, which are to jointly

- Form the core of the national and international resource for improving the practice of environmental public health
- Create a seamless approach, and complement each other's expertise, to address environmental public health threats
- Serve as a convener of all relevant parties with the aim of unifying environmental public health

Agency for Toxic Substances and Disease Registry



- Provide the science, service, and leadership needed to further improve the health of the people we serve.

During fiscal year 2001, ATSDR and NCEH continued to look for ways to collaborate on environmental health issues. For example, they collaborated on the dissemination of information for National Report on Human Exposure to Environmental Chemicals, which was issued by NCEH. The report provides information on the U.S. population's exposure to environmental chemicals. Through this collaboration, arranged by an interagency agreement, the ATSDR Information Center established an operator-answered toll-free number system and a clearinghouse for the report. About 4,500 documents were distributed to private citizens, universities, environmental groups, private companies, health departments, medical personnel, citizen groups, and others.

ATSDR also completed development of a new strategic plan during fiscal year 2001. The plan, which was finalized in early fiscal year 2002, covers the period 2002 through 2007. The plan provides a framework for the agency's overall vision and establishes critical measures to monitor progress. The development of the strategic plan followed a process that relied closely on input from internal and external stakeholders of the agency.

ATSDR Organizational Structure

ATSDR executes its operations through four program-specific divisions—the Division of Health Assessment and Consultation, the Division of Toxicology, the Division of Health Studies, and the Division of Health Education and Promotion.

Division of Health Assessment and Consultation

The responsibilities of the Division of Health Assessment and Consultation include the following activities.

- Conducting public health assessments or other evaluations of sites listed on the National Priorities List
- Responding to petitions for public health assessments
- Providing consultation on health issues related to exposure to hazardous or toxic substances, including consultations requested by EPA, state, or local officials
- Determining the extent of danger to public health from a release or threatened release of a hazardous substance

Division of Toxicology

The responsibilities of the Division of Toxicology include the following activities.

- Re-examining the CERCLA Priority List of Hazardous Substances annually and updating the list to include any additional hazardous substances found to pose a significant potential threat to human health. Updated lists are published every two years.
- Preparing a toxicological profile for each hazardous substance on the CERCLA Priority List of Hazardous Substances. In a toxicological profile, ATSDR scientists interpret all known information about a specific substance and identify the concentration level of the substance that may cause harm to people who are exposed to it. The toxicological profile also identifies significant gaps in knowledge about the substance, thus serving to initiate additional research when needed.
- Providing emergency response consultations to assist in determining the extent of danger to public health from a release—or threatened release—of a hazardous substance and

providing advice on preventing or mitigating the danger.

- Conducting a research program in cooperation with the National Toxicology Program to determine the health effects of those hazardous substances that ATSDR, EPA, and other agencies have described as lacking sufficient information.

Division of Health Studies

The responsibilities of the Division of Health Studies include the following activities.

- Conducting periodic survey and screening programs to determine relationships between exposure to toxic substances and illness
- Conducting epidemiologic studies that test scientific hypotheses to evaluate the causal nature of associations between disease outcomes and exposure to hazardous substances
- Conducting health surveillance programs of populations exposed to hazardous substances, including medical testing and referral for treatment
- In cooperation with the states, establishing and maintaining a National Exposure Registry of persons exposed to hazardous substances

Division of Health Education and Promotion

The responsibilities of the Division of Health Education and Promotion include the following activities.

- Conducting site-specific programs to assist communities and health professionals in understanding, preventing, or reducing adverse health effects of exposure to hazardous substances. These program activities promote awareness, share information, increase knowledge, promote behavioral changes, provide medical consultations, and communicate potential health risks.

-
- Supporting a wide array of environmental health education and promotion activities for health care providers, public health officials, and communities through cooperative agreement programs with national organizations of health professionals
 - Developing, distributing, and evaluating environmental public health information and training programs in various formats, languages, and media

Office of the Assistant Administrator

In addition to the program-specific divisions, ATSDR has several offices that provide administrative, scientific, or management support to the agency and its divisions. These offices are contained within the Office of the Assistant Administrator.

The Office of the Associate Administrator for Science (OAAS) serves as the agency focal point for science issues that have an impact on ATSDR programs and activities. OAAS provides administrative and technical support to ATSDR's Board of Scientific Counselors and the board's Community/Tribal Subcommittee, the ATSDR external peer review process, a monthly science forum that reviews science issues and develops proposals for senior management, and regular science seminars designed to keep staff informed on the latest relevant scientific developments. OAAS also conducts clearance of agency publications to ensure that scientific quality and policy standards are maintained. The office reviews all protocols for human subjects issues and serves as the liaison to CDC's Institutional Review Boards. OAAS has developed a long-range research agenda for ATSDR and tracks the agency's annual research expenditures.

In 1998, ATSDR established an **Office of Children's Health** to (1) coordinate child health programs throughout the agency;

(2) identify (in collaboration with other divisions and offices) new projects that benefit children; and (3) solicit input from and disseminate information to partner agencies and organizations. ATSDR's office complements EPA's formation of the Office of Children's Health Protection and the federal Task Force on Children's Environmental Health and Safety Risks (established under Executive Order No. 13045).

The **Office of Federal Programs** plans, recommends, manages, and coordinates the policies and procedures under which ATSDR works with federal agencies to conduct public health activities such as health studies, disease surveillance, toxicological profiles and research, health assessments and consultations, and health education and promotion. The Office of Federal Programs serves as the agency liaison with other federal agencies and is responsible for the negotiation, development, and monitoring of memorandums of understanding, interagency agreements, and annual plans of work between ATSDR and other federal agencies. ATSDR has memorandums of understanding with the Department of Defense (DOD), Department of Energy (DOE), National Aeronautics and Space Administration, Department of Agriculture, Department of the Interior, and the Agency for International Development.

The **Office of Policy and External Affairs** promotes the mission of ATSDR by coordinating the agency's efforts to build public health capacity in state and local entities, by providing analysis of agency policy, and by communicating information about ATSDR's activities. The office coordinates public affairs activities, provides graphics and editorial services to the agency, and produces various publications, reports, and fact sheets to communicate agency activities.

The **Office of Program Operations and Management (OPOM)** develops and executes ATSDR's budget, including Superfund and

Focusing on Communities

During fiscal year 2001, ATSDR continued its emphasis on working with people in communities to resolve their public health concerns about hazardous substances from waste sites or spills. ATSDR's Office of Urban Affairs, Community Involvement Branch, and Office of Tribal Affairs have a special focus on working with communities and are promoting innovative ways of involving people in environmental health decisions in their communities.

Office of Urban Affairs

The two overarching issues that were the focus of the Office of Urban Affairs fiscal year 2001 initiatives were environmental justice and eliminating ethnic and racial disparities in health. The Office of Urban Affairs' work with communities includes helping communities develop their capacity to collect, analyze, and disseminate health data.

An example of one of the Office of Urban Affairs' projects with communities is the Knollwood Community Health Survey, which is being conducted through the Minority Health Professions Foundation and Tuskegee University School of Veterinary Medicine's Center for Computational Epidemiology. This project examines the cancer-related concerns of the Knollwood community in East Montgomery, Alabama. The residents are concerned about an increased level of cancer-related morbidity and mortality in their community. The primary purpose of this 2-year health survey is to determine if the cancer experience in the Knollwood community is unusual. The specific objectives are (1) to re-create the cohort of all households in the Knollwood community since 1964 and collect baseline information, (2) to identify and verify all cases of cancer, and (3) to compare the observed to the expected number of cancer cases occurring in the community since 1980, after adjusting for age and gender.

Community Involvement Branch

ATSDR's Community Involvement Branch (CIB) in its Division of Health Assessment and Consultation is the central point of contact for communities at sites being evaluated by the agency's scientists. During fiscal year 2001, CIB planned and implemented approximately 1,100 community involvement activities.

One such activity was ATSDR's Blood Lead Screening Project in Anniston, Alabama, in which the community involvement staff partnered with Anniston community leaders and volunteers. The ATSDR Anniston Site Team began working with Anniston community leaders in November 2000 to develop an expanded blood lead screening project targeting all children under the age of 6. The staff members worked extensively with the community to develop a community involvement strategic plan for the screening project.

Community involvement staff members worked with the community to determine the most effective brochures on lead for their community, to identify the project campaign needs, and to determine community volunteers' roles and responsibilities. With the help of local community groups, ATSDR conducted six screening events during April and May 2001 and screened more than 400 children. The events reached the majority of "at-risk" children in the community, screening more than 66%.

Office of Tribal Affairs

ATSDR's Office of Tribal Affairs (OTA) is charged with developing policy and programs for working with American Indian and Alaska Native governments and people, and with responding to requests from American Indian/Alaska Native governments, organizations and communities. OTA serves as a central conduit for tribes to agency programs and services,



Meeting with Tribal members

assists ATSDR in responding to presidential executive orders, and coordinates activities to support tribes' specific public health needs.

In fiscal year 2001, OTA programs and activities increased significantly. In December 2000, OTA convened a nine-member panel for 2 days to address the potential for American Indian and Alaska Native populations to be exposed to hazardous substances through their use of native plants. The panelists discussed a variety of topics pertaining to exposure scenarios, commonly used plants, traditional uses of plants, the potential for plants to uptake metals, and other factors that could contribute to human exposure.

During fiscal year 2001, OTA announced the availability of funds for a cooperative agreement program to build environmental health capacity among American Indian tribal governments located near the Hanford Nuclear Reservation in Washington. Among the concerns of the American Indian tribes living downwind and downstream of Hanford are whether off-site contamination affected any native foods and local materials used in tribal products such as pottery, baskets, mats and clothing.

Under the cooperative agreement program, ATSDR will work with the seven Northwest Tribes to develop a tribal environmental health plan, address health issues related to the release of hazardous substances, and develop culturally appropriate health education materials. The seven tribes are the Coeur d'Alene, Nez Perce, Confederated Tribes of the Umatilla Reservation, Colville Confederated Tribes, Kalispel Tribe, Kootenai Tribe, and the Spokane Tribe.

In fiscal year 2001, ATSDR continued the funding of a cooperative agreement program with tribal colleges and universities. The College of the Menominee Nation, Wisconsin; Dine' College, New Mexico; and Turtle Mountain Community College, North Dakota, were funded to build programs for environmental public health. The colleges have developed curricula and resource materials and have provided internships in environmental health.

The office also provided agency staff members with training on working effectively with tribal governments. This training provided insights into appropriate protocols for working with tribal governments and addressed special considerations that should be given when assessing the health of American Indian and Alaska Native people.

OTA was involved in approximately 30 tribal sites in fiscal year 2001. Involvement ranged from coordinating meetings, making presentations, and assisting in writing health documents.

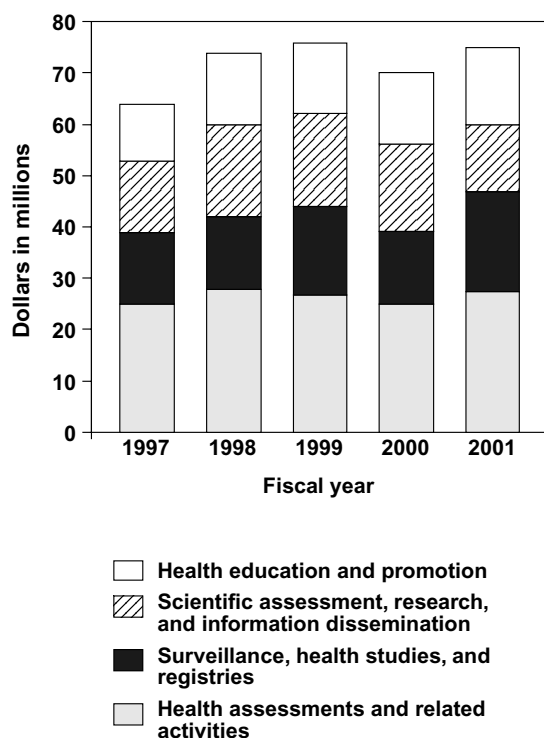
ATSDR Budget and Appropriations History

In fiscal year 2001, ATSDR received a direct appropriation of Superfund monies, as ATSDR received its own separate budget authority for the first time. Previously ATSDR was funded through EPA's appropriation. Funding

for ATSDR activities at federal facility sites is negotiated with the Department of Defense and the Department of Energy.

Figure 2 contains a breakdown of ATSDR's Superfund budget obligations, by budget activity, for fiscal year 1997 through fiscal year 2001.

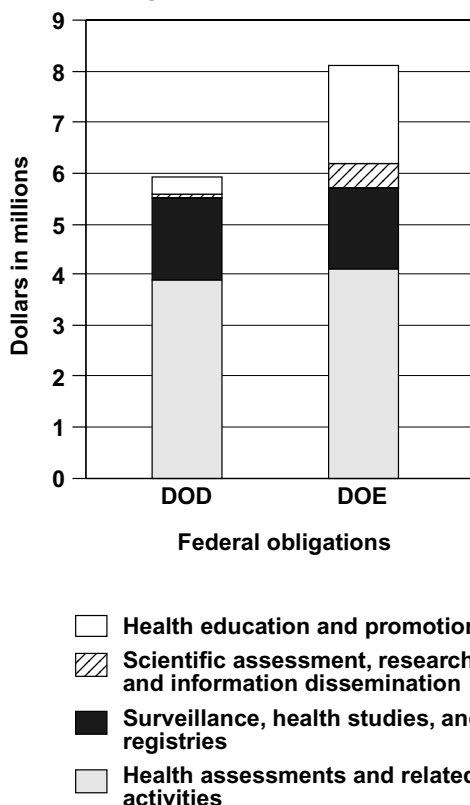
Figure 2. ATSDR CERCLA Budget (Nonfederal Obligations), Fiscal Year 1997–Fiscal Year 2001



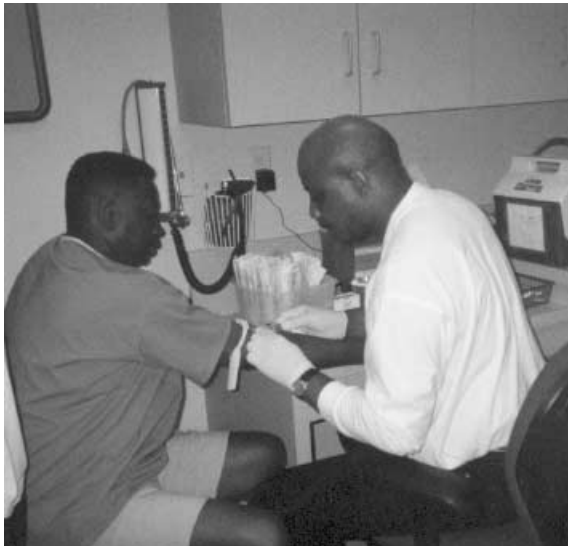
Since fiscal year 1997, ATSDR has received earmarked funds for work on the Toms River, New Jersey, childhood cancer evaluation project. Toms River community members were concerned about the number of childhood cancer cases and feared that exposure to environmental contaminants from the area's hazardous waste sites, including two National Priorities List

(NPL) sites, were related to the elevated incidence of childhood cancer. ATSDR is helping state health officials assess whether there is a relationship between exposure to the contaminants in the drinking water and incidence of childhood cancer. ATSDR's earmark for fiscal year 2001 for Toms River was up to \$1 million.

Figure 3. ATSDR's Fiscal Year 2001 Operating Budget From DOD and DOE



ATSDR is mandated by Congress to conduct public health assessments, health studies, surveillance activities, and health education at federal NPL waste sites, and to develop toxicological profiles of high-priority chemicals found at these sites. These tasks are complicated by the absence of a congressional mandate to federal agencies (with the exception of the Department



Medical testing

of Defense) to provide ATSDR with the necessary staff and budget to conduct these activities. ATSDR negotiates with the Department of Defense (DOD) and the Department of Energy (DOE) to establish annual workplans and budgets required to conduct its programs at their facilities. Figure 3 illustrates ATSDR's fiscal year 2001 DOD and DOE operating budgets, by budget activity.

In fiscal year 2001 ATSDR had a staff of about 415, who brought a variety of skills and expertise to the agency's work. ATSDR's staff includes epidemiologists, environmental engineers, health educators, hydrologists, physicians, toxicologists, and other public health professionals. One of the goals included in ATSDR's strategic plan for 2002 to 2007 is to foster a quality work environment at ATSDR. ATSDR has a very active Quality of Work Life Committee, which exists to facilitate communication between staff and senior management on the work-related well-being of all ATSDR employees.

During fiscal year 2001, ATSDR management and the Quality of Work Life Committee continued to develop activities to enhance internal communications, such as holding informal discussion sessions with the agency's assistant administrator. ATSDR also strives toward a commitment to diversity by recruiting at minority-led career fairs, seminars, and conferences; targeting minority journals and other advertising to fill vacancies; and sponsoring internships at targeted schools and universities.

Requests for Information From the Public

The ATSDR Information Center provides scientific and technical information to support ATSDR staff, agency constituents, and the public. The Information Center includes a research library, a clearinghouse, the ATSDR toll-free telephone access system, and a records management program. In fiscal year 2001, the Information Center responded to more than 22,300 requests and distributed more than 804,500 agency products and publications.

In addition to distributing information to the public, the ATSDR Information Center participates in several projects each year. For example, in fiscal year 2001, an ATSDR technical information specialist met with Albany, Georgia, librarians to discuss materials that are available for area residents who wanted to know more about trichloroethylene, a chemical found in some wells in the area.



ATSDR's Primary Partners in Assessing Sites

Cooperative Agreement Partners

***(activities also include health
education and some health
studies)***

Alabama - Alaska - Arizona - Arkansas
California - Colorado - Connecticut
Florida - Georgia
Gila River Indian Community - Idaho
Illinois - Indiana - Iowa - Louisiana
Massachusetts - Michigan - Minnesota
Missouri - New Hampshire - New Jersey
New York - Ohio - Oregon - Pennsylvania
Puerto Rico - South Carolina - Tennessee
Texas - Utah - Washington - West Virginia
Wisconsin

Hanford Area Tribes

Coeur d'Alene
Colville Confederated Tribes
Confederated Tribes of the
Umatilla Reservation
Kalispel Tribe
Kootenai Tribe
Nez Perce
Spokane Tribe

Identifying People Who Are Exposed to Hazardous Substances

One of ATSDR's primary goals is to identify people who are at health risk because of their exposure to hazardous substances in the environment. ATSDR's public health assessments, consultations, and related activities play a key role in achieving this goal. ATSDR's health assessment activities help identify people who potentially have been exposed to hazardous substances in the environment and help determine whether they might be at risk of adverse health effects. The activities that are part of the health assessment process also are often the trigger for a variety of other ATSDR activities and public health recommendations. The activities may identify a need for health education in a community, for health studies to be conducted, or for the issuance of a public health advisory to recommend immediate actions to prevent exposure. Helping ATSDR carry out health assessments and related activities were the states that have cooperative agreements with the agency to conduct health assessments and related activities.

During fiscal year 2001, ATSDR and its cooperative agreement state partners performed more than 1,800 health assessment activities in 44 states, Guam, the Navajo Nation, Puerto Rico, and Saipan. ATSDR's community involvement staff members have a significant role in ATSDR's activities at sites. These staff members work to establish and maintain partnerships with communities near sites where ATSDR is

conducting health assessments or consultations. Community involvement staff members facilitate collaboration and information exchange between ATSDR and communities and other government agencies involved at those sites. They provide an essential link between the community and the ATSDR scientists who are working to address the communities' health concerns and to protect public health.

ATSDR analyzed demographic data for 196 sites where health assessments or health consultations were conducted in fiscal year 2001.

Approximately 2.1 million people lived within a mile of those sites. Of those, about 11% were children aged 6 years or younger; and about 26% were under 18. About 22% were women of childbearing age. About 11% were elderly, aged 65 or older.

Overview of Public Health Assessment Findings

A public health assessment is a review of information about hazardous substances at a site and an evaluation of whether exposure to those substances at the levels found might harm people. Public health assessments often include recommendations about actions needed to prevent or mitigate potential health effects and identify any follow-up or additional studies that may be needed at the site to protect public health.

In fiscal year 2001, ATSDR and the cooperative agreement states prepared 196 public health assessment documents for 137 sites. Of these 137 sites, 100 (73%) were NPL sites, and 37 (27%) were non-NPL sites. (See Figure 1.) In addition, 15 were sites that were covered by the Resource Conservation and Recovery Act (RCRA), and 22 were sites for which the community or others had petitioned ATSDR to conduct a public health assessment. RCRA covers the control of hazardous substances at operating facilities, such as manufacturing plants.

ATSDR estimates that more than 1.3 million people live within 1 mile of the 137 sites that were assessed in fiscal year 2001. Of the 1.3 million people, about 367,993 live near non-NPL sites, and about 932,700 live near NPL sites. Of the sites assessed in public health assessment documents, 16% were found to pose a public health hazard.

Volatile organic compounds (VOCs) were the contaminant found most often at the sites assessed in fiscal year 2001. VOCs were detected at 20% of the sites. Other contaminants commonly found were trichloroethylene, which was found at 19% of the sites; arsenic, found at 18%; lead, also found at 18%; and tetrachloroethylene, found at 13%. (See Figure 2.)

Figure 1. NPL Status of Sites with ATSDR Public Health Assessment Activity in Fiscal Year 2001

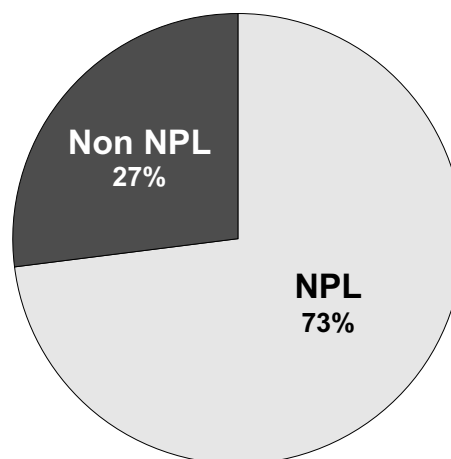
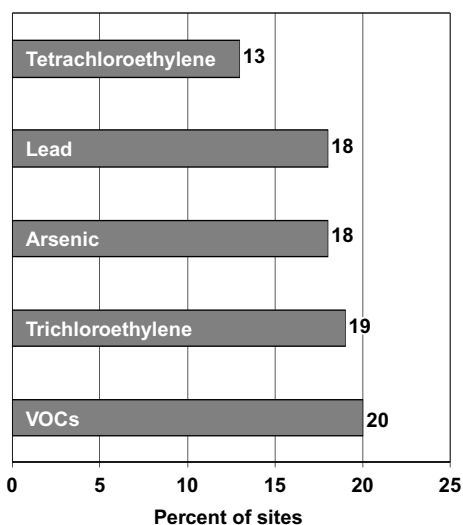


Figure 2. Major Contaminants Found at Sites Assessed in Fiscal Year 2001



About one-third of the sites assessed in public health assessments in fiscal year 2001 were manufacturing or industrial sites. Government-owned sites made up 16% of the sites where

public health assessments were conducted, and waste storage sites accounted for 16%. Ten percent were mining industry sites. (See Table 1.)

Table 1. Types of Sites Assessed in Fiscal Year 2001

Type of Site	Number of Sites	Percentage
Manufacturing	50	36
Government	22	16
Waste Storage or Treatment	22	16
Mining	14	10
School	1	1
Natural Area	15	11
Waste Recycling	12	9
Residential	1	1
Total	137	100

Following is an example of a site where a public health assessment was conducted in fiscal year 2001.

Paducah Gaseous Diffusion Plant, Kentucky

The Department of Energy's Paducah Gaseous Diffusion Plant was added to EPA's NPL in 1994 because elevated concentrations of trichloroethylene (TCE) and technetium 99 (Tc-99) were found in off-site groundwater. ATSDR's investigations also found other chemical and radiological contaminants were released to the air, surface soils, sediments, and surface water. Metal smelting operations in which nickel and aluminum were smelted in large quantities also occurred at the plant between 1952 and 1986.

ATSDR's draft public health assessment, which was issued in fiscal year 2001, concluded that the off-site community was not exposed to contaminants at levels of public health concern

under existing conditions and under normal plant operations. Past exposure was determined to be a public hazard for children in four residences who were routinely drinking water from their residential wells. There is no current groundwater exposure because these residences have been provided with alternative water supplies since 1988. The assessment also found that although past chronic exposure to airborne uranium and hydrogen fluoride was below levels of public health concern, past acute exposures were indeterminate because total release quantities and completed exposure pathways were uncertain. Groundwater exposure to vinyl chloride was also found to be an indeterminate public health hazard.

The public health assessment also noted some potential future health hazards. It warned that the rupture of depleted uranium cylinders, which could occur while the cylinders were being transported, could create an urgent public health hazard for anyone near the accident.

ATSDR also conducted a health consultation that specifically addressed nickel smelting because nickel is more toxic and was smelted in larger quantities than the other metals. The consultation found that potential off-site exposures to airborne nickel concentrations were not a public health hazard.

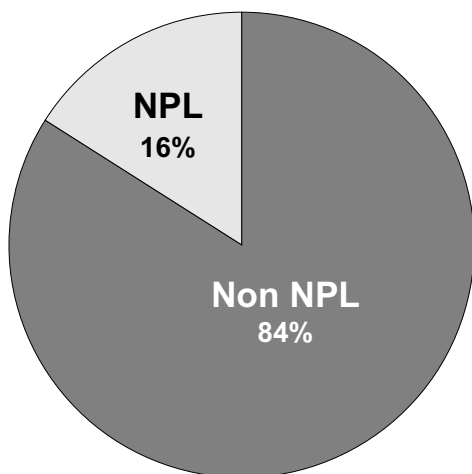
Health Consultations

Health consultations provide advice and recommendations on specific, health-related questions concerning actual or potential human exposure to hazardous substances or to other related human health hazards. A health consultation is often needed quickly to evaluate situations and recommend immediate actions to mitigate or prevent harm to human health from exposure to hazardous substances in the environment.

Consultations vary in complexity; either an individual health professional or a team may respond to a question about a site or issue. In some cases, ATSDR prepares more than one health consultation in response to a request for help with an exposure or potential exposure. Health consultation reports may be either written or oral, and they are timely; for example, an oral report might be provided on the day a request reaches ATSDR.

In fiscal year 2001, ATSDR staff members and state health assessors issued 343 health consultations (56 NPL, 287 non-NPL) for 333 hazardous waste sites in 38 states, the Navajo nation, and Saipan. Unlike public health assessments, the majority were non-NPL sites, (see Figure 3). Manufacturing or industrial sites were the main type of hazardous waste sites addressed by these health consultations. Eighty-seven of the health consultations responded to public health concerns about manufacturing or industrial sites.

Figure 3: NPL Status of Fiscal Year 2001 Health Consultations



Following are examples of sites for which ATSDR or its cooperative agreement partners provided health consultations in fiscal year 2001.

Herculaneum/Doe Run Company Primary Lead Smelter, Missouri

Operating for more than 100 years, the Doe Run Company's lead smelter in Herculaneum, Missouri, is the largest and oldest smelter operating in the United States. Residents in the community surrounding the smelter likely have been exposed to lead and other metals from air emissions, other process leakage, transportation spillage, and process-waste disposal for many years.

During fiscal year 2001, state officials discovered that highly concentrated lead ore was being spilled from trucks along residential streets. The ore, which was trucked to the smelter, had previously been transported via rail. Levels of lead ranging from 30,000 to 300,000 parts per million were discovered along streets, along the city park roadside, and at the smelter entrance. In response to the spills of lead ore along the streets, the Missouri Department of Health Services, ATSDR's cooperative agreement partner, advised state and federal regulatory agencies that "an imminent and substantial public health threat" was being posed to the residents of the community and that actions needed to be taken to eliminate this threat. In addition, ATSDR issued a public health consultation in July 2001 that found that past and present exposures to lead in the community posed a persistent and unacceptable public health hazard.

More than 600 residents were recently tested by the state health department, with help from ATSDR, during two voluntary, communitywide blood lead screening events. Of the 124 children under 6 who were screened for lead exposure, 36 (29%) had blood lead levels that were at



Herculaneum, Missouri

or above 10 micrograms per deciliter of blood, the level of health concern. In addition, the community was assessed to ensure that all children potentially at risk were identified, that testing was offered, and that the risks associated with lead exposure were communicated to the children's family members. Numerous health education activities were provided for residents, local physicians, and community officials during fiscal year 2001. The results of the blood lead screening have been summarized in a health consultation to be released in 2002.

As a result of the findings of the state health department and ATSDR findings, state and federal regulators have intensified their efforts to address the areas where ore has been spilled and to prevent future spills from occurring. They have also focused on quickly remediating contaminated residential yards and home interiors. State regulators posted signs along streets notifying residents of the risk from exposure to the spilled ore and advised them to avoid affected streets. The Missouri Department of Natural

Resources and EPA ordered Doe Run Company to clean and cover all trucks and to clean the streets along the hauling routes. A truck-washing operation has been established at the facility. Soil replacement activities and sampling were accelerated, especially concentrating on residences with children who had elevated blood lead levels or with children under 6 years of age.

Arrow Stone Park, Montana

In a health consultation conducted in fiscal year 2001, ATSDR resolved questions about whether arsenic-contaminated soil located in a Montana park posed health hazards. Arrow Stone Park was recently developed along the Clark Fork River outside Deer Lodge, Montana, in Powell County. The park is within the Clark Fork River Operable Unit of the Milltown Reservoir Sediments National Priority List (NPL) Site, which is contaminated with arsenic and other heavy metals from historic mining activities. Most of Arrow Stone Park is in the flood plain and was considered potentially affected by the contamination.

In previous exposure investigations in the Deer Lodge area, high concentrations of arsenic had been measured in soil near Arrow Stone Park. Local and state health officials requested ATSDR's assistance to resolve questions about the safety of Arrow Stone Park for recreational use by children and adults.

Because of changes in the park, the existing soil data were not representative of current site conditions. ATSDR worked throughout 2001 to reach an agreement with the EPA on the need for sampling and appropriate risk-based concentrations for the site. Upon reaching an agreement, ATSDR collaborated with EPA, Montana Department of Environmental Quality, Montana Department of Public Health and Human Services, Powell County, and Montana State University to develop a sampling and analysis plan for the proposed arsenic testing.

ATSDR performed the soil testing at Arrow Stone Park in September 2001, with oversight by EPA. As a result of the sampling, the park was determined to be safe for recreational use by children and adults. Results of the soil sampling were presented to the Powell County Health Board.

Tranguch Site, Hazleton, Pennsylvania

The Pennsylvania Department of Health (DOH) and ATSDR conducted a variety of public health activities in fiscal year 2001 in response to Hazleton, Pennsylvania, residents' concerns about gas fumes in their homes from the Tranguch site. Groundwater contamination at the site stemmed from a 1993 gasoline spill from a leaking underground storage tank. Gasoline vapors continued to seep into residences through sewer main breaks and former coal mines in the area, which provided a pathway for the spread of the contamination. The major contaminants of concern are benzene, toluene, ethyl benzene, and xylenes.

Since March 2001, the state health department has assigned a nurse to the site 3 days a week to provide consultations to residents. The state also reviewed indoor air sampling data and arranged for blood tests for residents living near the spill. More than 400 blood tests have been performed to date. On the basis of available data, results indicated that VOCs were not elevated in the blood of individuals tested. In addition, in the spring of 2001, ATSDR and DOH visited more than 80 households to answer health questions and provide information on the potential health issues associated with the site. DOH has prepared six facts sheets on the site and the chemicals of concern, has participated in three public meetings aimed at responding to the community's health concerns, and is currently conducting a cancer data review for the community. ATSDR prepared a health consultation to evaluate the



Tranguch Site, Pennsylvania

presence of the chemicals of concern in homes affected by site activities. ATSDR recommended action levels for the chemicals of concern.

As a result of ATSDR's and DOH's involvement and recommendations for the site, EPA has adopted health guidelines for the indoor air quality of homes in the area of the Tranguch site. EPA has also provided temporary relocations for residents during construction activities, on the basis of recommendations from DOH. ATSDR and DOH will also continue to review data for homes located in the vicinity of the site and make public health recommendations for remediation and/or additional sampling.

Exposure Investigations

Exposure investigations are conducted to gather and analyze site-specific information to determine whether human populations have been exposed to hazardous substances. Information is obtained through biomedical testing, environmental testing, and exposure-dose reconstruction. Biomedical testing (for example, urine or blood samples) can show current, and sometimes past, exposure to a contaminant.

Environmental testing (for contamination of soil, water, or air) is focused on where people live, spend leisure time, or might come into contact with contaminants under investigation. Exposure-dose reconstruction analyses use environmental sampling information and computer models to estimate the contaminant levels that people may have been exposed to. The data and information collected during an exposure investigation help determine whether people have been exposed and, if so, the extent of the exposure. The results of exposure investigations are used to make public health decisions and to recommend appropriate public health actions.

The focus of an exposure investigation is to identify and test residents with the highest potential for exposure. An exposure investigation is not intended to be a study or a complete characterization of a site. Rather, it is a transitional activity designed to provide information that will allow ATSDR to carry out its public health activities more efficiently and effectively. Follow-up activities to exposure investigations may include recommendations for additional sampling, an epidemiologic study, medical evaluations, health education, or more rapid public health action to reduce exposure.

ATSDR conducted 29 exposure investigations in fiscal year 2001. Following are three examples of these investigations.

American University (Spring Valley), Washington, D.C.

During World War I, the U.S. Army conducted chemical warfare research in the area where American University in Washington, D.C. is now located. Chemical weapons were detonated during research and testing operations, and chemical agents and weapons were buried in some areas. The testing areas have since been developed and are now occupied by university property and residential homes.



Soil testing

In January 2001, the U.S. Army conducted soil testing that documented the presence of arsenic-contaminated soil in the playground of the Child Development Center at the American University. Upon discovery of this contamination, university officials relocated the Child Development Center to another area of the campus.

Parents expressed concern over possible exposures to arsenic that their children may have received while playing in the playground. In response to their concern, the District of Columbia Department of Health requested that ATSDR conduct an exposure investigation of children and staff at the Child Development Center.

ATSDR collected hair samples from children and staff at the Child Development Center and analyzed the samples for arsenic. The results of the analyses indicated that hair arsenic concentrations were not elevated in the 28 children and 4 adults who participated in the exposure investigation.

Additional environmental testing by the U.S. Army has identified arsenic contamination of soil in some private residential properties in the Spring Valley community. In response to community health concerns over this contamination, the District of Columbia Department of Health requested that ATSDR conduct a second exposure investigation.

ATSDR has developed a proposal to conduct biological testing for exposure to arsenic in a limited number of residents of Spring Valley. Testing will focus on those residents with potential exposure to arsenic-contaminated soil in their yards.

Eureka Mills, Eureka, Utah

The Eureka Mills NPL site has a mining and milling history that began in 1870 and continued until approximately 1965. An estimated 11 former mill sites are located along the southern boundary of Eureka City. These sites consist of abandoned mill tailings and other mine-related wastes. In the spring of 2000, the Utah Department of Environmental Quality found extremely high levels of lead in soils in residential areas in Eureka and surrounding areas. Most residential areas had concentrations of lead higher than 500 parts per million (ppm), which is above the level of potential health concern, and 11% of the lots tested had more than 3,000 ppm of lead in soil. Arsenic and other heavy metals are also contaminants of concern at this site. An estimated population of 766 individuals reside in Eureka, Utah, according to the 2000 Census.

In August 2000, Utah Department of Health (UDOH) requested and received funds for an exposure investigation from ATSDR and, in collaboration with the local health department, provided free blood lead testing to Eureka residents. As a result, blood lead screening was conducted for 238 residents of Eureka during the summer and fall of 2000. Of the 238 individuals

tested, 30 had blood lead levels greater than or equal to 10 micrograms per deciliter, the level of health concern. Of the 55 children between the ages of 6 and 72 months tested, 13 (26%) had elevated blood lead levels. Of the 82 children between the ages of 6 and 17 years who were tested, 15 (18%) had elevated blood lead levels. Of the 98 adults tested, 2 (2%) had elevated blood lead levels. A blood lead risk survey was also completed for each individual tested. All those tested were notified of their results via phone call or letter. Primary health care givers of residents with elevated blood lead levels were notified, if consent was given.

As a result of the exposure investigation efforts, an estimated 30% to 40% of the Eureka community has been tested for blood lead. UDOH is striving to increase this percentage. UDOH will continue working with Eureka residents and local, state, and federal agencies to encourage blood lead testing, exposure reduction, and other forms of health education. In addition to informing residents of the importance of undergoing blood lead testing, UDOH has also provided valuable information to children and adults about ways to reduce exposure to lead.

ATSDR has provided both funding and guidance during the exposure investigation process. ATSDR continues to provide guidance with health education efforts and in the preparation of the public health assessment for this site.

Fountain Inn/Simpsonville, South Carolina

An ATSDR exposure investigation conducted in fiscal year 2001 found that some residents in the area of Fountain Inn, South Carolina, and Simpsonville, South Carolina, have had significant exposure to uranium in their drinking water. The South Carolina Department of Health and Environmental Control (SCDHEC) began testing residential wells for uranium in

the Fountain Inn/Simpsonville area after high levels of uranium were found in the hair of a local resident. SCDHEC identified about 40 wells that had uranium concentration levels above EPA's drinking water maximum contaminant level of 30 micrograms per liter and recommended that residents use alternative water sources for drinking water if their wells had elevated levels of uranium. An alternative source has been provided while municipal water lines are being constructed to serve the area.

In April 2001, ATSDR, in conjunction with SCDHEC, conducted an exposure investigation to assess and better characterize human exposure to uranium from well water in the area. Water samples were collected from 39 homes and tested for uranium. The wells tested had been in use from 5–20 years. Uranium concentrations ranged from none detected to 7,780 micrograms per liter, with a mean concentration of 521 micrograms per liter and a median concentration of 67 micrograms per liter.

Urine samples from 105 residents were tested for uranium 238 one to three months after they stopped drinking their well water. Uranium was detected in 104 of 105 samples (limit of detection (0.004 micrograms per gram of creatinine in the urine). The urine uranium levels ranged from nondetected to 2.7 micrograms per gram of creatinine. The concentration of uranium in urine samples from 94 of 105 residents (90 %) exceeded the 90th percentile of the national comparison population (0.024 micrograms per gram of creatinine).

Chronic exposure to high concentrations of uranium in drinking water can result in the accumulation of uranium in the kidneys, which can damage the proximal tubules. ATSDR notified the participants and, if requested, their personal physician about their results. ATSDR and SCDHEC physicians were available for consultation with personal physicians about their patients' test results and follow-up medical

management. ATSDR and SCDHEC staff developed informational materials for distribution to the local medical community. A state health department physician met with local physicians to present information about health effects.

Most of the uranium in the body is stored in the skeleton, but significant amounts are also stored in the kidney, liver, and other soft tissue. Since the pharmacokinetics of uranium in the body are complex and not completely understood, a follow-up exposure investigation is planned.

Responding to Spills and Other Emergency Events

ATSDR emergency response staff members provide health-related technical support to federal, state, and local responders during emergencies involving the uncontrolled release of hazardous substances. As resources permit,



Collecting dust samples at a NYC residence after September 11, 2001

they also do time-critical consultations. ATSDR emergency response coordinators have immediate access to various experts including chemists, toxicologists, environmental scientists, and medical professionals. Site-specific consultation teams can be convened to provide support 24 hours a day, usually within 30 minutes.



Ground Zero (Lower Manhattan, New York City)

ATSDR emergency response staff members received a total of 620 requests for assistance or consultation from EPA regional offices, other federal agencies, state and local agencies, and private citizens. Of these, 54 were acute events for which ATSDR provided information. During these emergencies, ATSDR assisted first responders in addressing the public health needs of more than 9,800 people who were potentially affected by these accidental spills or releases. In response to these requests, ATSDR provided protocols for treatment of people who were exposed to hazardous substances, evaluated the health implications of spills, and provided action levels to protect workers and the public. About one-third of the requests for assistance in acute events were made by EPA. The major emergency event occurring during fiscal year 2001 was the attack on the World Trade Center and the Pentagon. Following are details about ATSDR's activities to assist in the response to the attacks, as well as ATSDR's response activities in two other emergencies that occurred during fiscal year 2001.

Response to the Terrorist Attacks of September 11, 2001

In the weeks and months following the September 11 attacks on the World Trade Center and the Pentagon, ATSDR worked with other federal agencies, state and local health departments, and other organizations to respond to the enormous challenges of this tragedy. ATSDR staff members have assisted the response effort in a variety of ways—including mapping sampling locations, helping to develop screening guidelines for asbestos and other hazardous substances, sampling dust in Manhattan residences, and speaking with groups of business owners, residents, rescue workers, and others in New York to answer their health questions.

The collapse of the towers released large amounts of materials containing asbestos, silica, gypsum, and other substances. Residents were evacuated from their homes throughout lower Manhattan for several weeks, and those residents living in the area adjacent to the World Trade Center were displaced. A team of ATSDR technical staff was formed to review and evalu-



Indoor air sampling in New York City

ate the environmental monitoring data. These evaluations were conducted to determine what health effects may occur to the public as a result of the collapse of the Twin Towers. The team was also responsible for determining what public health actions were needed to address the needs of New York City. ATSDR technical staff members were sent to assist the New York City Department of Health. Their activities included preparing technical fact sheets on asbestos and related substances, giving presentations to the community, and helping to develop a residential sampling plan.

Indoor Air Sampling

The major public health action conducted by the ATSDR technical team was assisting the New York City Department of Health in implementing the plan for sampling the air in residences in lower Manhattan. The overall objective of the sampling effort was to help public health agen-

cies determine the potential for environmental exposures to dust and other materials from the World Trade Center and the possible health implications of these exposures. Sampling characterized ambient and indoor airborne and potentially airborne particles (surface dust) in residential areas of lower Manhattan.

Environmental Assessment Working Group

In addition to providing direct technical support to the New York City Department of Health, ATSDR participated in the federal Environmental Assessment Working Group. The workgroup was made up of representatives from the Department of Health and Human Services (DHHS), the EPA, and the Department of Labor. An ATSDR staff member was the DHHS representative to the workgroup. The purpose of the group was to coordinate public health and occupational sampling and data review among the three federal agencies in support of the New York City Department of Health and the New York State Department of Health.

Providing Geographic Information System (GIS) Assistance

On September 16, members of the team requested mapping support from the GIS program. Since that date, several staff members of the GIS program have contributed their support. The mapping products provided included:

- Building use maps of New York City
- Map of schools within 5 miles of the World Trade Center
- Population distribution maps for lower Manhattan from the 2000 Census
- Maps of sampling locations
- Daily asbestos sampling results maps
- Trend map for first two weeks of asbestos sampling
- Sampling results maps for dioxins, PCBs, and sulfur dioxide



GIS work

- Maps of residential buildings
- Building footprint maps and areal photo overlays for the sampling teams

Emergency Operations

In addition, the agency provided staff to the Emergency Operations Center/Centers for Disease Control and Prevention (EOC/CDC) as it began 24-hour operations. Additionally, ATSDR operated its own EOC for extended hours to support the response of public health and environmental officials.

ATSDR's emergency response coordinators worked with their counterparts from the National Institute for Occupational Safety and Health (NIOSH) of CDC to provide initial recommendations for the health and safety of rescue workers as these operations developed in New York City and Washington, D.C. The coordinators reviewed and commented on data concerning both the Pentagon and World Trade Center attacks and analyzed the potential health hazards of the contaminants in the dust from the World Trade Center collapse and provided initial hazard analysis.

In fiscal year 2001, ATSDR followed up on 89% (1,363 of 1,523) of site characterization and cease/reduce exposure recommendations made in the previous year's public health assessments and health consultations. Of these recommendations, 11% (146 of 1,363) were "obviated" (that is, made nonapplicable after subsequent actions or health consultations/assessments were conducted). Of the "unobviated" recommendations followed up, 74% were adopted, with 21% still pending adoption and 5% not adopted.

ATSDR's response also included the following activities:

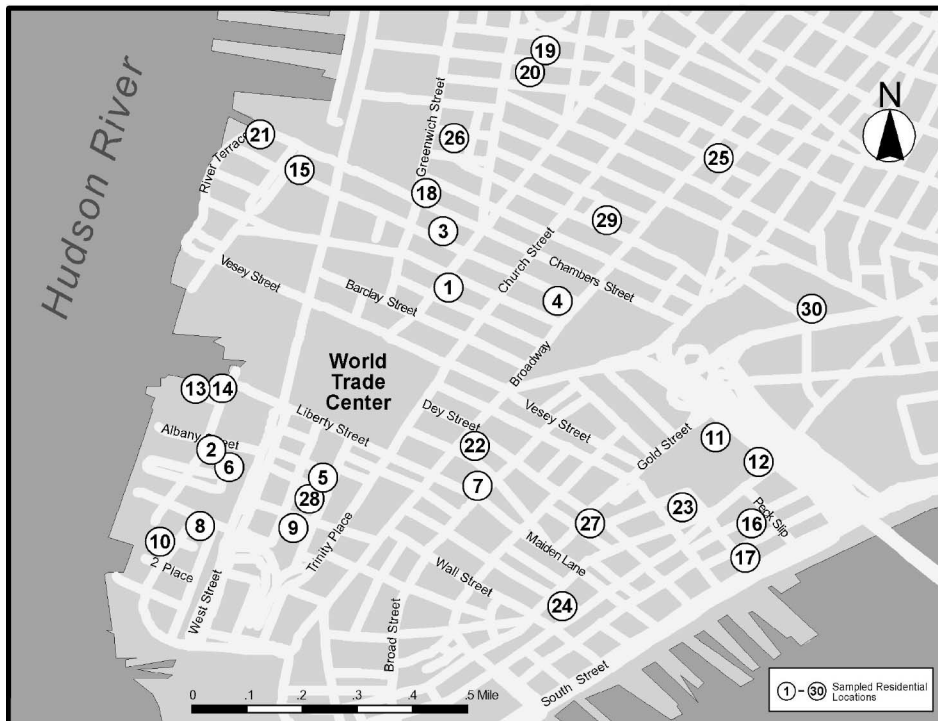
- recommending protective measures for the general public trapped in the plume caused by the collapse;
- assisting in drafting fact sheets requested by the White House on the possible health hazards posed by asbestos and the dust and debris from the World Trade Center's burning and collapse;
- assisting in developing a charter for an interagency workgroup on environmental assessment;



Residential Area Air and Dust Sampling Locations Lower Manhattan



November 4 - December 11, 2001



- developing a summary table of potential contaminants and comparison values based on extensive literature reviews.
- quickly communicating action levels on asbestos to public health officials, responders, and providers who urgently needed this information.
- developing an ATSDR peer-reviewed toxicological summary for contaminants detected at the World Trade Center. This document, which provided relevant and appropriate site-specific guidance values on the health haz-

ards of contaminants, could be immediately referenced by health care professionals at the scene.

- Reviewing sampling data for use by the New York City Department of Health and the EPA in determining the potential hazards of exposure. Principal among the many potential uses of this information by these entities was the assessment of dangers to public health, and to emergency response and rescue workers at the scene.

Response to Elemental Mercury Spill, Honolulu, Hawaii

On March 12, 2001, a police officer discovered that children from a neighborhood near Honolulu had collected buckets of elemental mercury from an abandoned building and contaminated numerous homes in the Puuwai Momi housing area. The abandoned building had originally been a pump station for the U.S. Navy. The children had broken into the building and acquired about 1.5 gallons of mercury from manometers designed to measure the pump's pressure.

The Hawaii Department of Health contacted ATSDR to request information on health effects, action levels, and clean-up methods for elemental mercury. Through March 14, 79 people from the neighborhood visited area hospitals to be evaluated. Of those, one person was admitted for observation, and another was provided outpatient chelation therapy. During clinical screening, which was offered at three locations in the community, 130 urine samples were collected. Of those samples, 90 were below background levels for mercury and 40 were above the background level, but none of the individuals was symptomatic.

Through March 20, an ATSDR consultation team provided daily conference call updates to the Hawaii Department of Health. Parameters for treatment, soil concentrations of potential concern, use of real-time meters, and comparison values for levels of mercury in blood collected by a private physician were among the issues discussed. By March 20, all 260 units of the Puuwai Momi complex had been evaluated. Of these, 73 were found to be contaminated and were cleaned using criteria based on ATSDR recommendations.

CSX Railroad Tunnel Fire, Baltimore, Maryland

ATSDR provided assistance to the EPA Region 3 on-scene coordinator regarding a July 21, 2001, CSX Railroad derailment and subsequent fire in the rail tunnel in the city of Baltimore, Maryland. As a result of the derailment, a railroad tanker car filled with hydrochloric acid was damaged and began to leak.

As the need for urgent emergency unloading of this car became apparent, ATSDR provided the on-scene coordinator with information detailing the toxicity and potential chemical reactions and incompatibilities involving two other hazardous materials (tripropylene and bis-2-ethylhexylphthalate) in addition to the hydrochloric acid held by railcars in the area of the fire. Agency emergency response personnel also reviewed and evaluated environmental data collected by the state and EPA.

ATSDR's evaluation of EPA and state data—and its subsequent recommendation—allowed emergency response workers to select the most appropriate equipment for responding to this incident. Specifically, the choice of emergency equipment required to enter a high hazard, confined space—the damaged railcar—and unload hydrochloric acid, was a direct result of the agency's recommendation. By the evening of July 22, 2001, all of the railcars containing hazardous materials had been removed from the tunnel without incident or injury to emergency workers.



ATSDR's Primary Partners in Conducting Toxicologic Research

Voluntary Research Program

Electric Power Research Institute, Inc.

General Electric Company (GE)

Halogenated Solvents Industry Alliance, Inc.
(HSIA)

American Chemistry Council (ACC)

Minority Health Professions Foundation Institutions

Charles R. Drew University of Medicine
and Science

Florida A&M University

Meharry Medical College

Morehouse School of Medicine

Texas Southern University

Tuskegee University

University of Rochester

Xavier University

Great Lakes Research

Michigan State University

New York State Department of Health

Research Foundation of State University
of New York at Buffalo

State University of New York at Albany

State University of New York at Oswego

University of Illinois at Chicago

University of Illinois at Urbana-Champaign

University of Wisconsin-Milwaukee

Wisconsin Department of Health
and Family Services

Chemical Mixtures Program

Colorado State University

Texas A&M University

Northeast Louisiana University

Wayne State University

Evaluating Relationships Between Hazardous Substances and Health: **Toxicologic Research**

A second major goal of ATSDR is to evaluate relationships between hazardous substances in the environment and adverse human health outcomes. To help achieve that goal, ATSDR has a toxicologic research program that is filling many of the data gaps about how hazardous substances affect human health. ATSDR also helps provide information about the relationship between hazardous substances and health outcomes by developing toxicological profiles that summarize information about many of the most hazardous substances found at Superfund sites.

ATSDR has 159 toxicological profiles covering about 800 substances.

Identification and Ranking of Hazardous Substances

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Priority List of Hazardous Substances contains the names of 275 substances found at NPL sites and believed to pose the most significant potential threat to human health. This list helps form ATSDR priorities on many issues. The Superfund Amendments and

Reauthorization Act of 1986 (SARA) requires ATSDR, in cooperation with EPA, to compile this priority list, which is drawn from all hazardous substances known to exist at NPL sites. The ranking of substances on the priority list is based on three criteria: (1) frequency of occurrence at NPL sites, (2) toxicity, and (3) potential for human exposure.

Table 1. Top 10 Substances on the 2001 Priority List

Rank	Name
1	Arsenic
2	Lead
3	Mercury
4	Vinyl chloride
5	Polychlorinated biphenyls
6	Benzene
7	Cadmium
8	Benzo(a)pyrene
9	Polyaromatic hydrocarbons
10	Benzo(b)fluoranthene

To ensure that the priority list is current, ATSDR periodically re-examines its information database (HazDat) of all hazardous substances known to exist at NPL sites. In October 2001, the 2001 CERCLA Priority List of Hazardous Substances was published. Its availability was announced in the Federal Register

on October 25, 2001 (66 FR 54014). The top substance on the 2001 Priority List of Hazardous Substances was arsenic, followed by lead and mercury (see Table 1).

Along with the publication of the revised priority list in October 2001, ATSDR also published an updated Completed Exposure Pathway Site Count Report. A completed exposure pathway (CEP) is an exposure pathway that links a contaminant source to a receptor population. The CEP ranking is based on a site frequency count, and thus lists the number of sites at which a substance has been found in a completed exposure pathway. The substance found in a completed exposure pathway at the most sites was lead, followed by trichloroethylene and arsenic (see Table 2).

Table 2. Hazardous Substances Found Most Frequently at Sites with a Completed Exposure Pathway (CEP)

Substance	Number of sites with substance in a CEP	
	All Sites	NPL Sites
Lead	359	238
Trichloroethylene	319	271
Arsenic	267	176
Tetrachloroethylene	236	190
Cadmium	176	123
Benzene	174	128
Chromium	169	113
VOCs	162	118
PCBs	152	104
Mercury	136	82

Preparation of Toxicological Profiles

CERCLA, as amended, requires ATSDR to prepare toxicological profiles for each hazardous substance on the CERCLA Priority List of Hazardous Substances. These profiles summarize the current scientific literature and interpret available toxicologic and epidemiologic information to determine levels of significant human exposure regarding the substances.

ATSDR also provides toxicological profiles at the request of the Department of Energy (DOE). Thirty-three toxicological profiles were under development as finals or drafts for public comment during fiscal year 2001. These profiles covered CERCLA substances and non-CERCLA substances identified by DOE (See Appendix B for a list of toxicological profiles completed in fiscal year 2001). The following toxicological profiles were developed at the request of DOE and released for public comment during fiscal year 2001: americium, cesium, cobalt, iodine, and strontium. These profiles will be revised in fiscal year 2002 based on public comments received and relevant new studies identified. Toxicological profiles developed in fiscal year 2001 featured a new chapter entitled “Relevance to Public Health” and a new section entitled “Toxicities Mediated Through Neuroendocrine Axis,” which will be added to all future profiles.

In fiscal year 2001, 152 toxicological profiles were available on CD-ROM. During the year, ATSDR continued a quality control assessment which involved reviewing, editing, and revising all toxicological files on the agency’s Internet site.

Fact sheets (called ToxFaQs), containing material drawn from ATSDR public health statements, were revised as appropriate based on the release of new or updated toxicological profiles

during fiscal year 2001. ATSDR now has 152 fact sheets in print and posted on the Internet in HTML and PDF format.

Among the toxicological profiles issued in fiscal year 2001 was a comprehensive update of DDT/DDE/DDD. This publication was based on a thorough review of highly relevant scientific studies published since the release of the previous version in 1994. This publication was useful to treaty negotiations on persistent organic pollutants (POPs). The document provided the negotiators with a critical and comprehensive review of current science related to DDT health effects, environmental fate, and potential for human exposure. DDT was one of 12 POPs considered for a worldwide ban. The POPs treaty ultimately retained DDT as an option for emergency use for malaria control.

ATSDR's Substance-Specific Applied Research Program

ATSDR is working to determine the relationships between adverse human health outcomes and hazardous substances through its Substance-Specific Applied Research Program (SSARP). CERCLA requires that for each hazardous substance listed, ATSDR, in consultation with EPA and other public health agencies and programs, assess whether adequate information is available on the health effects of the substance. Furthermore, the law requires that ATSDR, in cooperation with the National Toxicology Program, initiate a research effort designed to determine the health effects of those substances for which adequate information is not available (or under development).

A major focus of the SSARP is to fill the research needs the agency has identified. ATSDR used several mechanisms to fill these priority data needs in fiscal year 2001. These included industry testing through EPA rule-making, private-sector voluntarism, and univer-

In fiscal year 2001, about 45 graduate and undergraduate students were being trained in environmental health and toxicology research at universities participating in ATSDR's Environmental Health and Toxicology Research Program with the Minority Health Professions Foundation.

sity-based research conducted through an agreement with the Minority Health Professions Foundation. Additional research needs are being addressed in collaboration with the National Toxicology Program and through other agency programs, including ATSDR's Great Lakes Human Health Effects Research Program.

Significant progress has been made in filling the priority data needs. During fiscal year 2001, ATSDR re-evaluated the current exposure and toxicity information for the 50 substances currently part of the SSARP, identifying 190 distinct priority data needs. To date, 101 priority data needs are being addressed via the mechanisms that ATSDR has implemented, and 62 of these have been filled. Data obtained from the research program are currently being used to update ATSDR toxicological profiles and to develop health-guidance values for hazardous substances evaluated in ATSDR's public health

assessments conducted at waste sites. Also in fiscal year 2001, ATSDR continued to expand its SSARP by identifying priority data needs for an additional 10 priority hazardous substances, bringing the current total number of substances with a research agenda to 60. Specifically, during fiscal year 2001, ATSDR published the priority data needs associated with the additional 10 substances in the Federal Register and solicited public comments.

Industry Testing Through EPA

Substances With Some Research Needs to Be Addressed by Industry Testing

- Benzene
- Chloroethane
- Hydrogen cyanide
- Methylene chloride
- Sodium cyanide
- Tetrachloroethylene
- Toluene
- Trichloroethylene

The Toxic Substances Control Act of 1976 (TSCA) authorizes EPA to ensure that chemicals are safe for their intended use. EPA places some of this responsibility on chemical manufacturers and processors by requiring them to conduct toxicologic testing. Costs of conducting this research are borne completely by the industries.

During fiscal year 2001 ATSDR and EPA finalized information to support development of a TSCA test rule for eight substances that are currently part of ATSDR's Substance-Specific Applied Research Program. The agency has identified exposure and toxicity priority data needs for these eight substances. A test rule is a legally enforceable document that describes (1) EPA's authority to require testing, (2) the specific testing required, (3) why it is required, and (4) who should conduct the testing.

The research findings from the Great Lakes Human Health Effects Research Program were included in the technical support document of the Stockholm Convention on Persistent Organic Pollutants (POPs) entitled, "The Foundation for Global Action on Persistent Organic Pollutants: A United States Perspective." The findings served to inform the dialogue at this convention regarding the phase-out of POPs.

During recent discussions, EPA officials noted that the ATSDR test rule remains a top priority for fiscal year 2002, and publication of the proposed test rule is expected in the summer of 2002.

Private Sector Voluntarism

ATSDR encourages industry to voluntarily conduct needed research into the toxicity of priority chemicals. During fiscal year 2001, ATSDR had Memoranda of Understanding in place with three private-sector organizations to address about 16 research needs for 5 substances. These three organizations are General Electric

Company (GE); Halogenated Solvents Industry Alliance (HSIA), Inc.; and the American Chemistry Council (ACC), formerly called the Chemical Manufacturers Association. The activities associated with this program are responsible for monetary savings to the agency approaching \$10 million.

In addition to the substance-specific Memoranda of Understanding (MOUs) with these three organizations, ATSDR also signed an MOU with the Electric Power Research Institute, Inc. (EPRI) in fiscal year 2001. EPRI volunteered to support a study, “Verification of Techniques for Assessing the Effects of Neurotoxicants on Neurodevelopment in Children” that is being administered by a grant from ATSDR to the University of Rochester. The objective of the study is to validate a battery of neurodevelopmental tests for use in assessing the effects of prenatal or postnatal exposure to developmental neurotoxicants. The validation of these tests will be useful for further assessing the developmental neurotoxicity of some of the ATSDR priority substances, such as PCBs, methylmercury, and lead. In addition to the private sector support, ATSDR is coordinating a federal effort (via interagency agreements with EPA, the Food and Drug Administration, and the National Institute of Environmental Health Sciences) to support the study.

Substances With Some Research Needs Addressed By Private-Sector Voluntarism

- Methylene chloride
- Polychlorinated biphenyls
- Tetrachloroethylene
- Trichloroethylene
- Vinyl chloride

Trichloroethylene

During fiscal year 2001, ATSDR reviewed and accepted the conclusions of an HSIA study assessing the developmental toxicity of trichloroethylene, a substance found in at least 993 NPL sites. This study addresses an important research need for trichloroethylene, that is, to determine whether infant development is affected by breathing this chemical. The HSIA study was conducted in rats exposed to trichloroethylene via inhalation for 6 hours a day, 7 days a week on days 6–20 of gestation to evaluate the substance’s potential for maternal and developmental toxicity. The HSIA study did not indicate developmental toxicity at any of the concentrations used ranging from 50 to 600 ppm trichloroethylene. However, at 600 ppm, maternal toxicity was noted as significant decreases in body weight gain on gestation days 6 through 9. HSIA plans to submit a study protocol to use physiologically based pharmacokinetic modeling to estimate oral intakes of trichloroethylene-contaminated environmental media that would not produce human developmental toxicity.

Research Program of the Minority Health Professions Foundation

The Minority Health Professions Foundation’s Environmental Health and Toxicology Research Program is a partnership that involves minority health-professions schools located throughout the nation. A major component of the Substance-Specific Applied Research Program, this research program provides ATSDR with a major mechanism for filling gaps in knowledge about the effects of hazardous substances on human health.

Examples of significant new findings from the program in fiscal year 2001 include the following:

- Males may be affected more severely by short-term exposure to polycyclic aromatic hydrocarbons than females are.
- Exposure to low doses of mercuric chloride results in adverse effects on fertility and reproduction. However, effects are lessened in succeeding generations.
- Males and females may have reduced reproductive performance when exposed to low levels of zinc chloride.
- Power sanding exterior paint from old houses poses a severe health risk, particularly to children, because of the release of lead-contaminated dust.

New research findings from this program are incorporated into updated toxicological profiles and fill priority data needs. In addition to being the agency's primary mechanism to address data gaps for hazardous substances, the Environmental Health and Toxicology Research Program supports the agency's efforts to address environmental justice concerns.

Mixtures Assessment and Research Program

People who are exposed to contaminants from waste sites are often exposed to mixtures of hazardous substances because such sites frequently contain multiple chemicals. The principal aim of ATSDR's Mixtures Assessment and Research Program is to develop methods for assessing the joint toxicity of exposure to multiple chemicals that are commonly found at hazardous waste sites. The program seeks to identify pertinent mixtures, to assess joint toxicity, and to conduct experimental testing to fill research needs.

As part of the mixtures program, a series of documents—interaction profiles—have been developed for certain priority mixtures that are

of special concern to ATSDR. Interaction profiles are prepared for simple mixtures of 4 to 6 chemicals. ATSDR's interaction profiles for chemical mixtures are intended to provide current toxicological information on mixtures of hazardous chemicals and information on public health implications resulting from exposures to these mixtures around hazardous waste sites.

Interaction profiles are written based on the Guidance for the Preparation of an Interaction Profile. This document—also finalized in fiscal year 2001—is intended to ensure consistency among all profiles in structure and in basic scientific concepts that are considered “state-of-the-art” in chemical mixtures research. The profiles feature brief summary data on toxicity, toxicokinetics, and toxicodynamics of the single components of the mixture, data on the whole mixture (if available), and evaluation of the evidence for interactions among the mixture components. They also provide conclusions, where possible, on the relevance of these data to public health.

Interaction profiles finalized in fiscal year 2001 are as follows:

- persistent chemicals found in breast milk (chlorinated dibenzo-p-dioxins, hexachlorobenzene, p,p'-dde, methylmercury, and polychlorinated biphenyls)
- persistent chemicals found in fish (chlorinated dibenzo-p-dioxins, hexachlorobenzene, p,p'-dde, methylmercury, and polychlorinated biphenyls)
- 1,1,1-trichloroethane, 1,1-dichloroethane, trichloroethylene, and tetrachloroethylene
- arsenic, cadmium, chromium, and lead

The guidance document and four profiles were to be available on CD-ROM in early fiscal year 2002. Development of several interaction profiles was initiated during this year, not only

for those chemical mixtures found at hazardous waste sites on the NPL but also those mixtures that are found at Department of Defense (DOD) and Department of Energy (DOE) sites.

Also during fiscal year 2001, ATSDR continued its support of experimental research to enhance the understanding of the underlying mechanisms of toxicity following exposure to chemical mixtures. Scientists from ATSDR and the Toxicology and Nutrition Office of the Netherlands, selected a chemical mixture and predicted its toxicity based on assessment methods used to evaluate environmental chemical mixtures. Following this, a carefully designed in vivo study with the 4-component mixture was completed. The results are being analyzed and will be compared with the predicted results to evaluate the accuracy of the predicted toxicity.

Computational Toxicology Program

ATSDR's Substance-Specific Applied Research Program incorporates state-of-the-art computational toxicology methods to aid in interpreting and assessing short, intermediate, and long-term health effects associated with exposure to hazardous substances. These methods include physiologically based pharmacokinetic/pharmacodynamic (PBPK/PD) modeling, structure-activity-relationship (SAR) techniques, and benchmark dose (BMD) models. PBPK/PD, BMD, and SAR are computer-based mathematical models used to predict the action of chemicals on the body in the absence of adequate experimental data. The alternative to mathematical models is experimental work that can take months to years to complete and is often costly.

For example, SAR was used to evaluate a series of unusual chemicals identified by the New Jersey Department of Health and Senior Services in drinking water in Dover Township, an area that had a high incidence of childhood

cancer. The toxic endpoints evaluated included mutagenicity, carcinogenicity, and developmental toxicity. These chemicals were tetrachlorophthalic acid, tetrachlorophthalic anhydride, chlorendic anhydride, chlorendic acid, o-chlorostyrene, m-chlorostyrene, p-chlorostyrene, alpha beta dichlorostyrene, bis (4-chlorophenyl) sulfone, triallyl isocyanurate, 1,2-diphenylhydrazine diphenylamine, N-ethyl-p-toluenesulfonamide, N-methyl-p-toluenesulfonamide, and styrene-acrylonitrile dimer. Data analysis showed that 9 of the 15 chemicals have a potential for carcinogenicity, 6 have potential for developmental toxicity, and 6 have a potential to cause mutagenicity.

Other activities of the Computational Toxicology Program in fiscal year 2001 include the following:

- Interaction PBPK models were developed to evaluate the joint toxicity of carbon tetrachloride, tetrachloroethylene, and trichloroethylene.
- Child-based PBPK models were constructed for tetrachloroethylene to help in the assessment of risk to children who live close to a hazardous waste site.

Great Lakes Human Health Effects Research Program

The Great Lakes Human Health Effects Research Program is intended to build on, and amplify, the results of past and ongoing fish-consumption research in the Great Lakes basin, using existing structures and institutions already involved in human health research. This ATSDR-supported research program studies known at-risk populations to further define the human health consequences of exposure to persistent toxic substances identified in the Great Lakes basin.



Fishing in the Great Lakes

During fiscal year 2001, significant research findings were reported. Those findings include the following.

- The relationship between maternal consumption of contaminated fish and birth weight was assessed in mothers. Children born to mothers who consumed more than the median number (116) of fish meals before their pregnancy were 5.4 times more likely to have low birth weight.
- Maternal serum PCBs and DDE concentrations were significantly associated with fish consumption, but only PCBs were significantly associated with low birth weight.
- The relationship between prenatal exposure to PCBs and performance on the McCarthy Scales of Children's Abilities was assessed in 212 children at 38 months of age and again at 54 months. PCBs were statistically associated with measurable deficits in McCarthy

performance in children at 38 months. No relationship between PCBs and measurable deficits in McCarthy performance was observed when the children were reassessed at 54 months of age.

- A survey of couples exposed to PCBs and DDE found that men who had higher levels of PCBs were more likely to father boys. The couples were surveyed to estimate the sex odds ratio for parental PCB and DDE. When controlling for maternal exposure and parental DDE exposure, the sex odds ratio was increased if PCB levels were elevated. Out of 206 children born to the couples surveyed, 126 were boys and 82 were girls. Typically, according to scientific literature, the human sex ratio is about 106 boys and 100 girls. Thus, paternal exposure is linked to a higher proportion of male offspring.

Alaska Traditional Diet Project

Foods and dietary practices of Alaska Natives differ from that of the general U.S. population. There are emerging concerns about the potential contaminant burden among Alaskans who eat subsistence foods. ATSDR's Alaska Traditional Diet Project, an effort begun in October 2000, was developed to assist consumers of Alaskan traditional foods in making informed dietary decisions to prevent adverse health outcomes.

The project was developed in response to concerns about the effects of environmental contamination that is present in Arctic and sub-Arctic regions. Many Alaskans worry that exposures to contaminants resulting from a subsistence lifestyle, or through commercial and recreational activity, can potentially lead to cancer, worsen existing conditions such as diabetes and asthma, and increase the incidence of other health problems.

To enable them to have informed choices about foods, Alaskans have requested more information about the risk from these exposures and the nutritional benefits of traditional foods. In collaboration with Alaska Native organizations and others, the Alaska Traditional Diet Project will conduct dietary surveys in rural communities where there is concern about possible contaminants in locally harvested foods.

During fiscal year 2001, the dietary survey tool was completed. The Alaska Native Health Board is currently identifying communities to conduct surveys. In addition, a workshop was held that strengthened Alaskan Native infrastructure to deal with future contaminant issues. ATSDR scientific staff members are providing technical support to all efforts through active participation on the Alaska Native Health Board oversight committee.



ATSDR's Primary Partners in Conducting Health Studies

Hazardous Substances Emergency Events Surveillance States

Alabama - Colorado - Iowa - Louisiana
Minnesota - Mississippi - Missouri
New Jersey - New York - North Carolina
Oregon - Rhode Island - Texas - Utah
Washington - Wisconsin

States Conducting Health Studies

California - Colorado - Florida - Illinois
Kansas - Louisiana - Massachusetts
Minnesota - Missouri - New Jersey
New York - Ohio - Texas - Utah - Wisconsin

Evaluating Relationships Between Hazardous Substances and Health:

Conducting Health Studies

ATSDR conducts and supports health studies to evaluate the relationship between exposure to hazardous substances and adverse health effects. Many of these studies have focused on seven priority health conditions ATSDR identified as the health conditions considered to be most sensitive to exposures to hazardous substances. These are birth defects and reproductive disorders, cancer, immune function disorders, kidney dysfunction, liver dysfunction, lung disease, and neurotoxic disorders. ATSDR also conducts studies to evaluate how people become exposed to hazardous substances.

ATSDR completed 11 health studies during fiscal year 2001 and initiated another 11 health studies. In addition, work continued on 28 health studies. ATSDR also continued several surveillance activities in fiscal year 2001, including its surveillance of hazardous spills and releases in a number of states.

ATSDR's health studies program provides services to communities and expands the knowledge base for public health decisions and program development. One of the major health study activities during fiscal year 2001 was the medical evaluation of people exposed to asbestos-contaminated vermiculite in Libby, Montana. More than 7,000 people were provided medical testing, including spirometry (which measures the breathing capacity of the



Chest x-ray

lungs) and chest x-rays (which can identify changes in the lungs and the lining of the lungs that may be the result of asbestos exposure). In addition, a couple of new studies are underway in Libby.

The following are summaries of the Libby, Montana, health studies, as well as summaries of other health studies that ATSDR completed in fiscal year 2001.

Examples of Health Studies

Medical Testing of Individuals Potentially Exposed to Asbestos-form Minerals Associated with Vermiculite in Libby, Montana

ATSDR conducted a medical screening program in Libby to evaluate the health of residents and former residents who were exposed to asbestos-contaminated vermiculite, a mineral mined and processed in Libby for many years. From July to November 2000, there were 6,149 participants in the asbestos medical testing sponsored by ATSDR. When testing was offered again from

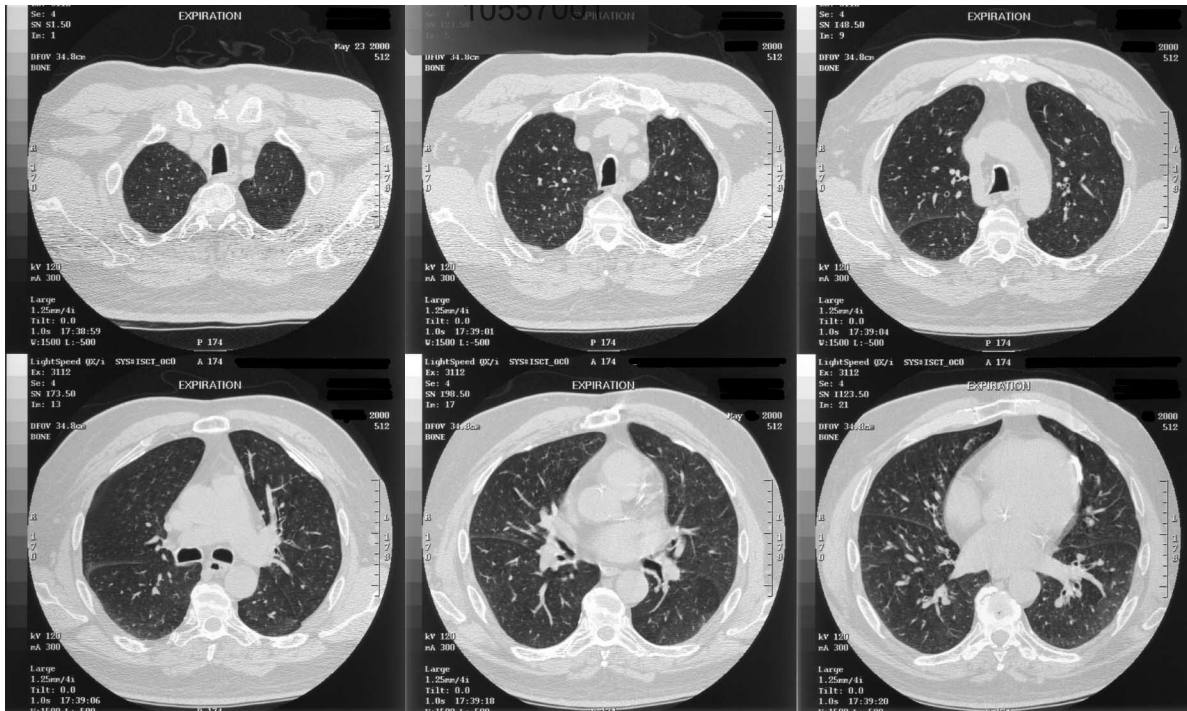
In fiscal year 2001, ATSDR provided funds to seven states to conduct asbestos-related health activities for communities that received contaminated Libby ore.

July to September 2001, an additional 1,158 participants were screened in Libby. Those eligible for testing included former W.R. Grace workers from Libby and people who lived, worked, or played in Libby for at least 6 months before December 31, 1990, when the vermiculite mine and facilities closed. W.R. Grace owned and operated the vermiculite mining and processing operations in Libby for a number of years.

The testing included an interview to obtain information needed to better analyze the health information; a three-view chest x-ray; and a spirometry test of lung function. Findings for the testing that was conducted from July to November 2000 include the following:

■ **X-ray Findings**—Only study participants 18 years of age and older were eligible for x-ray testing. At least two of three experts who reviewed the x-rays found that 994 of those 5,590 participants (18%) had pleural abnormalities (thickening or scarring of the pleural lining of the lungs). The risk of pleural abnormalities increased with age and length of residence in the Libby area. Forty-eight percent (159 of 328) of former vermiculite facility employees had pleural abnormalities. Five percent (6 of 122) of those participants who reported no apparent exposure had pleural abnormalities. Factors most strongly related to having pleural abnormalities were (1) having been a vermiculite facility worker, (2) having household contact with a worker, and (3) being a male. The risk of having a pleural abnormality was almost 8 times greater for former vermiculite facility workers when compared to people of the same age who had not worked in the vermiculite facility. The risk of finding a pleural abnormality was 3.3 times greater for females who have household contact with vermiculite facility workers when compared to women who have no household contacts with these workers. The risk of having a pleural abnormality was 5 times greater for men than for women.

■ **Lung Function Test Findings**—Lung function tests were offered to all study participants. Being a current smoker was the strongest risk factor for restricted breathing. Moderate-to-severe restriction in breathing capacity was found in 5.7% of former W.R. Grace workers. Moderate-to-severe restriction in breathing capacity was found in 2.2% of men who were over 18 years of age and 1.6% of women who were over 18. In those under 18 years of age who were tested, no one had moderate to severe restricted lung function. Other factors affecting restricted breathing included (1) being a non-worker (that is, not working in a vermiculite facility) who was exposed to vermiculite, (2) having had chest surgery, and (3) being overweight.



CT scans

Mortality from Asbestosis in Libby

In a health consultation, ATSDR analyzed mortality from asbestosis in Libby for 1979–1998. Death certificates were reviewed for the period. Mortality in Libby as a result of asbestosis for the 20-year period was 40 to 60 times higher than expected, as compared to Montana and U.S. rates, respectively. Excess asbestosis-related mortality strongly indicates that historical exposure to asbestos in Libby was much greater than in other areas of Montana or the United States, the health consultation report found. Mesothelioma mortality was also elevated. However, it was difficult to precisely evaluate the degree to which mesothelioma mortality was elevated because statistics on this extremely rare cancer are not routinely published at the state and national levels.

The Usefulness of Computed Tomography (CT) in Detecting Pulmonary Lesions Not Found by Chest Radiograph in Individuals Exposed to Asbestos (Libby, Montana)

This study is being conducted to address the community’s questions about whether computed tomography (CT) scans are more sensitive than chest x-rays in detecting asbestos-related abnormalities. The study is evaluating the usefulness of CT scans for 353 participants of the Libby Medical Testing Program, conducted in the summer of 2000. They were selected at random from those participants for which only one of the chest radiograph reviewers reported an abnormality.



Libby dry mill in operation (plant has since been closed)

Of the 353 participants, 55 are former vermiculite mine or processing workers, 99 are workers' household members, and 199 are people reporting contact with vermiculite through recreational activities. The CT scans were performed in Libby and reviewed by three national experts in the evaluation of CT scans. Following the CT scan review, 128 participants were notified that they had medical problems that required immediate attention. Results letters were sent to the remaining participants and if consent were given, to their physicians. The study data will be analyzed in fiscal year 2002.

Confirmation of Asbestos-Related Abnormalities Among Patients from Libby, Montana: An Interim Report on the Pilot Study of Environmental Cases

A referral pulmonologist has evaluated more than 200 patients from the Libby area for asbestos-related disease. Most of these patients are former employees of the mining operation or their household contacts. However, several patients are believed to have an asbestos-related disease as a result of environmental (nonoccupational) exposure. If these cases are valid, the number of former and current Libby residents who are at risk for asbestos-related disease may be much higher than previously thought.

ATSDR is currently conducting a pilot study of these patients who have had no occupational-related exposure to asbestos. These cases are



Chest x-ray of Libby resident

being identified from medical records of the referral pulmonologist. The goals of this pilot study are to confirm the presence of asbestos-related abnormalities and to identify exposure pathways. A panel of experts will review the participants' chest x-rays and CT scans to confirm asbestos-related abnormalities. Participants will also be interviewed.

Asbestos Registry

One of ATSDR's Congressional mandates is "...establishing and maintaining national registries of persons exposed to hazardous substances and persons with serious disease or illnesses." ATSDR is establishing a registry of former vermiculite workers and their families. This registry will serve as the focal point of future health studies of these populations and allow ATSDR to quickly disseminate new information on new diagnostic techniques and therapies to registrants.

This project will follow medical testing conducted by ATSDR. Following the completion of the medical testing conducted in 2000, ATSDR

began the process of identifying and locating former Libby vermiculite workers and their families. Workers were identified (n=1935) by acquiring W.R. Grace Co. documents and searching them for worker names, dates of birth, and social security numbers. In addition to the 1,935 workers, ATSDR estimates that there will be 4,000 family members included in the project.

Activities at Vermiculite Sites Receiving Ore from the Libby Mine

For decades, contaminated ore from the Libby mine was shipped throughout the United States to processing facilities in different cities. EPA identified and is evaluating vermiculite facilities in the United States that received vermiculite ore from the Libby mine. The EPA list identifies 313 potential sites in 42 states. The activities at these potential sites included the manufacturing of building construction materials, steel, plastics, fertilizer, and chemicals.

People living near these vermiculite processing facilities may have had higher-than-average levels of asbestos exposure. The most probable route of human exposure to asbestos-contaminated vermiculite was inhalation, either from occupational exposure, from nonoccupational ambient air exposure, or from exposure to contaminated clothing of household members who were facility employees.

In fiscal year 2001, ATSDR provided funds to seven states (California, Colorado, Louisiana, Massachusetts, Minnesota, Utah, and Wisconsin) to conduct asbestos-related health activities for communities that received contaminated Libby ore. Six states will be conducting health statistic reviews for communities that had exfoliation plants and/or facilities that received contaminated vermiculite ore. They will be using existing health outcome data (that is, cancer registry data and vital records data) to determine whether the numbers of cases of

certain asbestos-related diseases, such as mesothelioma, asbestosis, and lung cancer, are elevated for the community. All six states will be using a standard protocol designed by ATSDR. The states are still gathering the data for these sites. The seventh state, Minnesota, will be conducting a community survey to determine the extent of the area where contaminated ore was distributed locally in preparation for conducting a broader epidemiologic investigation.

Prevalence of Adverse Health Outcomes in Residents of the Area Surrounding the Former Feed Materials Processing Center at Fernald, Ohio, Participating in the Fernald Medical Monitoring Program

University of Cincinnati Medical Center investigators conducted a study with funding from ATSDR to determine the prevalence of nonmalignant health outcomes in persons who lived near the Feed Materials Production Center, a U.S. Department of Energy (DOE) uranium processing plant located near Fernald, Ohio. This study used questionnaire data and a physical examination of participants of the Fernald Medical Monitoring Program (FMMP). The data were collected at the time of the participants' first medical examination upon enrollment in the program.

Residential history data from questionnaires were used to establish two sets of exposure categories: (1) those living near the plant (within a 2-mile radius) versus those living farther away and (2) those living in the direction of groundwater runoff (south of the plant) versus other directions. Questionnaire data also were used to identify a subpopulation of FMMP participants who used a well or cistern as a drinking water source.

Findings included indications that living within the Fernald exposure area in the past is related to health effects on urinary system function. Statistically significant elevations for both kidney disease and bladder disease were noted. Several conditions contributed to this excess, including kidney stones and chronic nephritis (inflammation of the kidneys), as well as elevated rates for hematuria (blood in the urine) and urinary strictures (narrowing of the urinary tract). In regression analyses adjusted for age and sex, serum creatinine levels were found to be increased in those living closer to the plant, while urinary creatinine was decreased and urinary microalbumin increased in those using a well or cistern in the exposure area. Increased serum creatinine, decreased urinary creatinine, and increased urinary microalbumin may indicate kidney damage consistent with exposure to uranium.

Alterations in whole blood components also were found in FMMP participants. Those who had previously lived within 2 miles of the plant were found to have increased white blood cell counts, increased hemoglobin levels, and decreased mean corpuscular volume. The subpopulation of FMMP participants who used a well or cistern was found to have increased red blood cell counts and increased hematocrit.

Other findings from these data analyses, such as the apparent increase in thyroid disease and the increase in alanine aminotransferase levels, require additional data and further analysis before any conclusions can be made. Statistically significant elevations for both goiter and "other thyroid disease" were found with comparison to the National Health Interview Survey (NHIS) population, and for "other thyroid disease," when compared to the National Health and Nutrition Examination Survey (NHANES) population. Excess of thyroid disease was higher in those FMMP participants who had "ever lived" within 2 miles of the plant,

although still present in those who lived only at the 2 to 5 mile distance. This apparent increase in thyroid disease also could have been the result of using different methods of collecting data about disease conditions, since the FMMP data were obtained during physician medical history taking, while the NHIS and NHANES data were collected with in-person interviews.

Impact of Ambient Hydrogen Sulfide and Total Reduced Sulfur Levels on Hospital Visits for Respiratory Diseases in Dakota City and South Sioux City, Nebraska

In response to community concerns about high levels of hydrogen sulfide in the outdoor air in Dakota City, Nebraska, ATSDR examined the association between total reduced sulfur and hydrogen sulfide levels and hospital visits for asthma and all respiratory diseases. This investigation was designed to take advantage of ambient air monitoring data that had been collected by EPA to support a separate epidemiologic investigation of neurobehavioral health status. Total reduced sulfur levels and hydrogen sulfide levels were characterized as high if at least one of the daily rolling averages was at least 30 ppb and low if the rolling average was less than 30 ppb (the ATSDR MRL for intermediate exposure).

A positive association for children less than 18 years of age was found between hospital visits for asthma or respiratory illness and a measurement of high total reduced sulfur levels on the previous day. Hospital visits for children with respiratory illness was an average of 27% higher on days following high total reduced sulfur levels and 65% higher for those children with asthma. A positive association for adults was also found between asthma hospital visits and high hydrogen sulfide levels on the previous



ATSDR's Dakota City site office

day. A positive association also was found between hospital visits for all respiratory diseases and high hydrogen sulfide and total reduced sulfur levels on the previous days, but only for children, not for adults. No association was found between sulfur air pollution levels and hospital visits by adults or children for all digestive diseases, which was a comparison diagnostic category.

This is the first epidemiologic study to examine variations in ambient air levels of hydrogen sulfide and hospital visits for respiratory diseases. These findings suggest that total reduced sulfur or hydrogen sulfide levels may be associated with exacerbations of asthma or all respiratory diseases among the residents of Dakota City and South Sioux City.

The findings of this investigation were presented at a public meeting in Dakota City in May 2001. Community residents viewed these results as validating their health concerns. Because hydrogen sulfide is a fairly prevalent air contaminant, these results are also of interest to the broader environmental health community. These findings, although somewhat exploratory, offer an important hypothesis worthy of further examination.



Working with hazardous waste

Hazardous Waste Worker Surveillance

In 1993, ATSDR, in collaboration with the Laborers' Health and Safety Fund of North America, established a health interview surveillance system to follow prospectively a cohort of construction trade workers who had completed the initial training course for hazardous waste workers required by the Occupational Safety and Health Administration. The surveillance project included workers trained at 17 centers and 5 mobile locations nationwide. The purpose of the surveillance system was to detect trends and clusters in the occurrence of occupational illnesses and injuries that are associated with hazardous waste remediation. Information from the follow-up interviews would be used to guide intervention actions for disease and injury prevention.

A cohort of 5,583 workers completed the initial training course and participated in the baseline health interviews during the period January 1, 1993, through April 12, 1996. ATSDR completed a report on this data in fiscal year 2001,

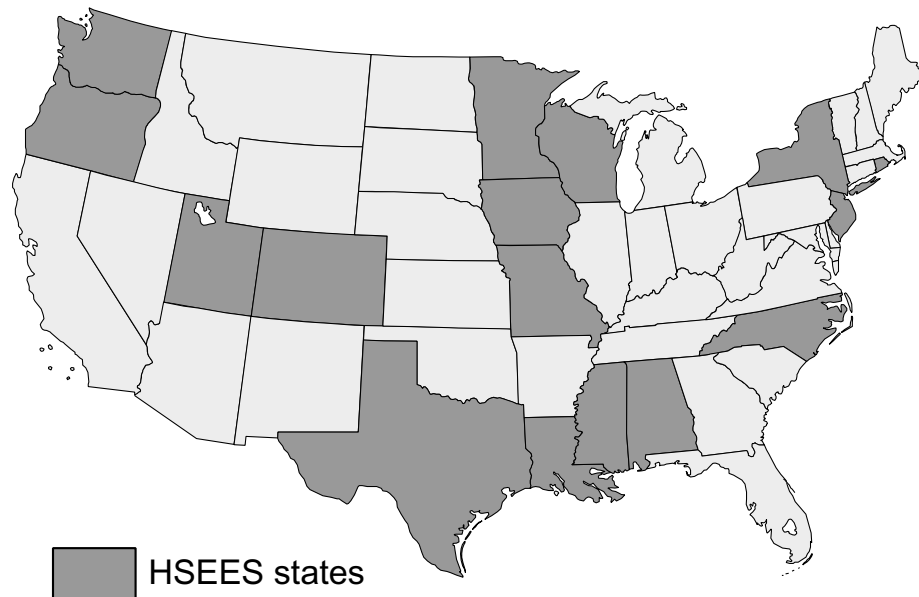
which will be published in fiscal year 2002. Approximately 90% (N=5,022) of these workers completed their first year follow-up health interview, and 78% (N=4,358) completed their second year follow-up health interview. Smaller percentages of the original cohort completed their third (66%, N=3,693) and fourth (51%, N=2,846) follow-up health interviews. Approximately 9% of the cohort were specifically trained for remediation work at Department of Energy hazardous waste sites

Of those completing the first through third year follow-up interviews, about 60% were employed as laborers most of the time, and an additional 10% worked most of the time in other construction trade jobs. Approximately 9% were women, 17% were African American, and 9% were Hispanic. Among those who completed the first follow-up year health interview, 29% worked at least 1 week at a hazardous waste site. A much smaller percentage of those completing second and third year follow-up health interviews worked at least 1 week at a hazardous waste site, 19.1% and 14.8% respectively.

Data from the follow-up interviews indicated that workers performing hazardous waste site remediation consistently reported high blood pressure, work-related hearing loss, weakness or numbness in the extremities, skin rash, and arthritis or joint inflammation more often than the cohort as a whole. In addition, these workers also tended to more often report neurological symptoms such as dizziness, irritability, and memory loss, as well as nausea, eye, nose and throat irritation, and tinnitus. Although increased reporting for some conditions may partly be an artifact of the medical monitoring that is required for all hazardous waste workers, it seems unlikely that all these conditions and symptoms can be explained in this fashion.

Workers who performed hazardous waste site remediation also reported more injuries due to chemical exposures and heat stress than

Figure 1. States participating in HSEES in Fiscal Year 2001



the cohort as a whole. Lost-day injuries that occurred to hazardous waste workers and to the cohort as a whole were similar in nature to those observed in studies of construction trade workforces. Between 25% and 30% of lost-day injuries occurred to workers who reported that they were not wearing personal protective equipment at the time of injury. Elevated rates of chronic diseases such as heart disease and cancer were not expected during the first 4 years of followup evaluated in this report because of the long induction and latency periods for these diseases, as well as the fact that the cohort consisted of healthy workers capable of performing hazardous waste site remediation.

Workers involved in hazardous waste site remediation are potentially exposed to high levels of complex mixtures of chemical contaminants, as well as physical hazards. The findings of the surveillance system reinforce the importance of prevention strategies such as worker training, the proper use of personal protective equipment, and the maintenance of a safe workplace, in order to minimize injuries and disease.

Hazardous Substances Emergency Events Surveillance (HSEES)

Since 1990, ATSDR has maintained an active, state-based Hazardous Substances Emergency Events Surveillance (HSEES) system. The purpose of HSEES is to describe the public health consequences associated with the release of hazardous substances and to develop strategies to reduce and prevent releases and their associated adverse health effects. In fiscal year 2001, 16 states participated in HSEES; New Jersey and Utah began collecting data in 2000 and Louisiana in 2001.

During fiscal year 2001, ATSDR published a report summarizing the findings of the surveillance for the 5-year period from 1993 through 1997. During this period, 10 states participated in HSEES for all 5 years: Alabama, Colorado, Iowa, New York, North Carolina, Oregon, Rhode Island, Texas, Washington, and Wisconsin. Four states participated during portions of the period considered: Minnesota, Mississippi, Missouri, and New Hampshire.

An ATSDR study of railroad emergencies reported to the HSEES found that official orders to evacuate or to “take shelter in place” occur more frequently during railroad emergency events than other types of hazardous waste spills and releases.

This report for the period 1993–1997 included information on 24,359 hazardous substance events and 9,613 injured persons (110 of whom died). Participating states used the 1993–1997 data analysis to identify and implement prevention outreach activities that were geared to preventing spills, releases, and resulting injuries. Prevention activities have included developing fact sheets, reports, posters, presentations, web sites, news articles, and journal articles. These activities were focused on counties and industries (for example, chlorine users, transportation, and agricultural industries) with the most frequent spills, and the most frequently spilled chemicals (that is, ammonia, chlorine, mercury, pesticides, and illicit methamphetamine chemicals). Other prevention activities have targeted population groups that are frequently injured, such as employees, first responders, and students. Preliminary feedback suggests that these activities increased knowledge in the target

groups. Increased knowledge leading to sustained behavior change may result in decreased releases and fewer injuries.

ATSDR also used HSEES data during fiscal year 2001 to analyze spills and releases of hazardous substances from train derailments and other railroad emergency events. ATSDR found that railroad emergency events that involved hazardous substances increased during the period analyzed, 1993–1998. ATSDR’s analysis also found that these events were potentially more harmful to the health of the general public than other types of spills and releases, such as those from fixed facilities. Railroad events were more likely to occur in residential areas and



Train derailment

during times when people were more likely to be at home. Also, victims of railroad events were more likely to need hospital treatment than were victims of other types of emergencies.

The results were published in an article in the *Journal of Occupational and Environmental Medicine*. The article recommended some actions to lessen the potential harm, such as developing community-based education campaigns in high-risk areas.



ATSDR's Primary Partners in Preventing Health Effects Related to Hazardous Substances

Cooperative Agreements with National Organizations

American Academy of Pediatrics
American Association of Occupational Nurses
American College of Medical Toxicology
American College of Preventive Medicine
Association of Occupational and Environmental Clinics
Association of State and Territorial Health Officials
Migrant Clinicians Network
National Alliance for Hispanic Health
National Association of County and City Health Officials
National Environmental Health Association

Pediatric Environmental Health Specialty Units

Association of Occupational and Environmental Clinics
Boston Children's Hospital
Cook County Hospital
Emory University
Environmental Protection Agency
George Washington University Medical Center
Harborview Medical Center
Mt. Sinai—Irving J. Selikoff Center for Occupational and Environmental Medicine
National Jewish Medical and Research Center
University of California—Irvine
University of California—San Francisco
University of Iowa
University of Texas Health Center

Health Education and Promotion in Tribal Communities

Indian Health Council, Inc. (IHC)
Eight Northern Indian Pueblos Council Inc. (New Mexico)
Ely Shoshone Tribe
Nuclear Risk Management for Native Communities
St. Regis Mohawk Tribe (New York)

Tribal Universities

College of Menominee Nation (Wisconsin)
Dine' College (New Mexico)
Turtle Mountain Community College (North Dakota)

Children's Health

Kids for Saving Earth

Preventing Health Effects Related to Hazardous Substances

ATSDR achieves its goal of preventing or reducing the harmful health effects of exposure to hazardous substances by drawing on its resources in health education, risk communication, environmental medicine, and health promotion to assist communities. ATSDR provides services such as training for local physicians about the health concerns associated with contaminants to which their patients might be exposed, providing communities with information and education about the health effects of hazardous substances, and providing clinical evaluations and screenings such as testing for lead exposure. ATSDR also conducts health education and promotion activities with a nationwide focus, such as its Case Studies in Environmental Medicine program.

ATSDR's activities are conducted with the assistance of numerous partners with whom the agency has cooperative agreements—states, American Indian tribal nations or groups, and national organizations. In fiscal year 2001, 29 state health departments received funding to plan, implement, and evaluate community and health professional education related to hazardous waste sites and other unplanned chemical releases. At the end of the fiscal year, an award was made to 33 health departments, which included five new partners. ATSDR, in cooperation with its cooperative agreement partners, performed health education activities at approximately 310 sites this year. ATSDR is in the

second year of a new 5-year agreement with 10 national organizations (up from 5 under the previous agreement). ATSDR also expanded its network of Pediatric Environmental Health Specialty Units (PEHSUs) in fiscal year 2001, with 11 now in operation.

Pediatric Environmental Health Specialty Unit Program

The Pediatric Environmental Health Specialty Unit Program (PEHSU) is designed to promote children's health by encouraging medical specialists with environmental expertise to work collaboratively with pediatricians to develop pediatric environmental medical expertise and to improve the ability of parents and locally practicing health care providers to access this expertise. In 1998, three pilot units were established in Seattle, Boston, and New York City. These units focused on conducting activities in the areas of medical education and training, telephone clinical consultation and outreach, and clinical evaluation of children who might have been exposed to hazardous substances in the environment.

From this modest beginning, in fiscal year 2001 the PEHSU program has grown to include

- a national network of 11 operating units (see Figure 1)



Figure 1. Location of Fiscal Year 2001 Pediatric Environmental Health Specialty Units

- the addition of EPA as a partner in all of the units
- the establishment of PEHSUs by international agencies in Mexico and Canada using the ATSDR PEHSU model
- the continuing and increasing interest and demand for PEHSU services from the public and from government agencies at all levels
- opportunities to collaborate with additional partners, such as the Centers for Children’s Environmental Health and Disease Prevention Research
- an impact on the field of pediatric environmental health as a potential medical subspecialty
- the development of a body of published articles, curricula, and educational materials.

The number of PEHSU activities has increased since the units were established. In fiscal year 1998, 123 children were evaluated in PEHSU clinics; in fiscal year 2001, 907 children were evaluated. In fiscal year 1998, the units received a total of 14,534 consultation calls from health care providers and the public; in fiscal year 2001, the number had grown to 30,581 calls during the year. In fiscal year 1998, 672 health

professionals were reached with education or training; in fiscal year 2001, more than 16,275 were reached.

PEHSUs provide expertise that can help resolve the perplexing health problems some children face. For example, one PEHSU consultation helped a 13-year-old girl return to school after suffering weeks of disabling symptoms. The girl had experienced headache, eye irritation, congestion, and shortness of breath. Occasionally, she had throat tightness and rashes. Her symptoms only occurred when she was at school, and often forced her to leave school early. Symptomatic medications and a specialty evaluation for allergic disorders were not helpful.

She stayed home for 6 weeks because of her escalating symptoms. Other students, teachers, and staff who reported similar symptoms confirmed her problems. An engineering firm evaluated the heating, ventilation, and air conditioning system serving the school building. The engineers discovered that the fresh air intake shutters on the roof were very close to the air exhaust vents for the school. Some building re-engineering work was ordered.

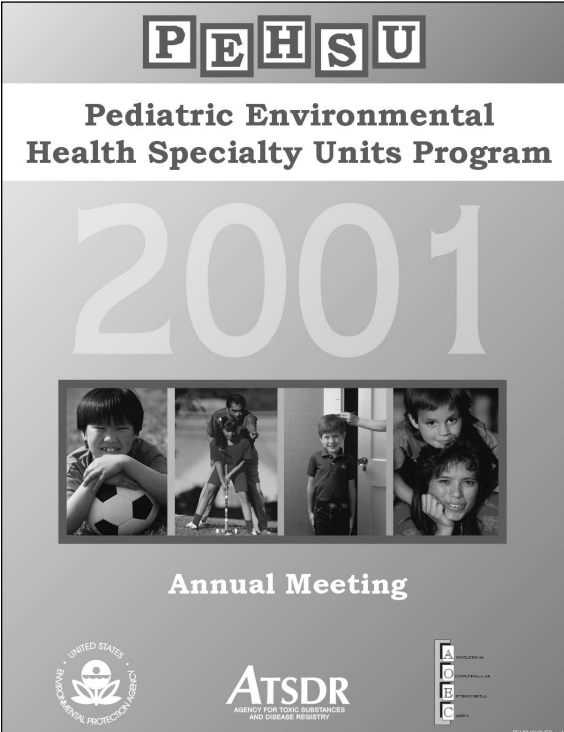
In fiscal year 1998, ATSDR's Pediatric Environmental Health Specialty Units received a total of 14,534 consultation calls from health care providers and the public; by fiscal year 2001, the number had grown to 30,581.

PEHSU staff conducted a site visit and asked the girl to walk through two other area schools, one of which had satisfactory air quality. The student transferred to another school on the advice of the PEHSU and her symptoms disappeared. PEHSU staff provided liaison work and evaluations that neither the pediatrician nor allergist alone could accomplish. PEHSU staff worked with other families from the school and with local and state public health officials to resolve the indoor air quality issues.

Health Education Activities for Communities

ATSDR's health education activities are designed to assist communities in understanding, preventing, or mitigating adverse health effects associated with exposure to hazardous substances. These activities include providing information and training to health care providers and providing information to enable people in communities to prevent or reduce their exposure to hazardous substances.

In April 2000, ATSDR became involved at Pueblo Chemical Depot at the request of the U.S. Army because the community expressed the need for health care provider training. Community input was gathered through small meetings with community representatives. Residents informed ATSDR that provider training on the potential health effects of the contaminants of concern should be preceded by community health education. During the course of the next several months, ATSDR representatives established a grass-roots dialogue with local residents that allowed the residents to decide how, when, and where they would like to receive their information. The community also made suggestions as to what type of professional (e.g., what discipline or credentials) would be best to provide the education. This knowledge was compiled into a health education needs assessment and health education action plan, which identified specific activities for each of the two phases (community health education and health care provider education).



The poster features the acronym 'PEHSU' in large, bold, block letters at the top. Below it, the text 'Pediatric Environmental Health Specialty Units Program' is written in a smaller, bold font. The year '2001' is displayed in very large, light-colored numbers. A horizontal strip of four small photographs shows children in various settings: a boy with a soccer ball, a child playing a sport, a child in a doorway, and a close-up of a child's face. Below the photos, the words 'Annual Meeting' are printed in a bold font. At the bottom left is the Environmental Protection Agency logo, and at the bottom center is the ATSDR logo (Agency for Toxic Substances and Disease Registry). On the bottom right, there is a vertical stack of three small icons labeled 'A', 'B', and 'C'.

The community education component of the action plan was completed on March 8, 2001, with a public presentation to 60 residents by a subject matter expert. The presentation noted the following conclusions:

- An intermittent, low level of explosives exists in the water.
- A low risk of adverse health effects related to groundwater exists.
- The Colorado Department of Public Health and Environment identified no increase in birth defects or cancer for the area.

During the months of October and November 2001, follow-up telephone calls were made to the depot, state and local health officials, and residents to determine whether the goals of the program had been met, and whether any additional health-related concerns had been identified. Community members seem to have moved past the primary health concern stage and have begun to address the demilitarization process and evaluate potential pollution generated by a new industry in the area.

Discussions with community members indicated that overall communications between agencies and the public has increased, as evidenced by the Chemical Demilitarization Citizen's Advisory Commission meetings conducted off base in Pueblo. In addition, new treatment facilities have been installed at the Avondale community well, further increasing community confidence.

Educating Health Professionals Nationwide

ATSDR works through a variety of mechanisms to provide health education and information to health professionals nationally. Activities include grand rounds presentations, off-site

seminars and workshops, newsletters, fact sheets, satellite broadcasts, and Web-based training. ATSDR often enters into partnerships with other organizations in these efforts. Partners include national organizations, local universities, and professional societies. ATSDR health education activities have been focused on implementing a national strategy to provide environmental health training for nurses and other frontline health care providers, and expanding partnerships in environmental health expertise.

Health Promotion Activities at Sites

Health promotion supports three key goals: prevention (proactive actions to prevent the adverse effects of hazardous substances), intervention (actions to diminish or eliminate adverse consequences of exposure to hazardous substances), and capacity building (actions to strengthen existing public health infrastructures to enhance environmental health services for affected communities).

During fiscal year 2001, ATSDR expanded its capacity to provide communities with assistance and training on coping with the stress communities face related to their exposures to hazardous substances. Communities exposed to hazardous substances suffer from elevated levels of psychosocial stress. The purpose of the community stress program is to mitigate the effects of stress associated with exposure to hazardous substances

Following are examples of 2 of the 42 sites where ATSDR conducted health promotion activities in fiscal year 2001.



Air Photo of Fallon, Nevada, and surrounding area

Fallon, Nevada

In March 2001, the Nevada Health Division contacted the ATSDR community stress program for assistance with designing a community stress intervention strategy for Fallon, Nevada. Fallon is a small town in northwest Nevada that is experiencing a documented cluster of childhood leukemia cases. The cause of this cluster is unknown.

In April 2001, a formal needs assessment planning committee led by the state of Nevada began to meet. The committee was composed of personnel from the Nevada Division of Mental Health and Developmental Services, Nevada Health Division, Substance Abuse and Mental Health Services Administration (SAMSHA), Fallon Mental Health Clinic, ATSDR community stress program, and Fallon Families First, which is a nonprofit charitable organization

that provides assistance for families that have a family member diagnosed with leukemia. A 2-day needs assessment conference, Building a Community Response Plan, was held July 12–13, 2001, in Fallon. Those involved with the conference included doctors and nurses, social workers, educators for the school district, mental health staff members, mayor's office representatives, clergy, community college staff, police, media, Fallon Naval Air Station representatives, and the business development association. The ATSDR team shared with the community some of the issues community members can expect to face while dealing with the cluster.

One outcome of the needs assessment was the formation of the Community United Response Team (CURT) in August 2001. CURT is an interagency committee in Fallon formed from key leaders and agencies identified by the needs assessment conference.

CURT currently oversees an integrated inter-agency support system for the families affected by leukemia, including a staff person funded by the state of Nevada. CURT's mission is to provide community-based information and to coordinate services in response to the Fallon leukemia cluster.

Also during 2001, a variety of community stress program training events were held in Fallon, including two continuing medical education seminars for doctors and nurses on "How to Talk to Patients about Health, Uncertainty, and the Environment."

Tranguch Site, Hazelton, Pennsylvania

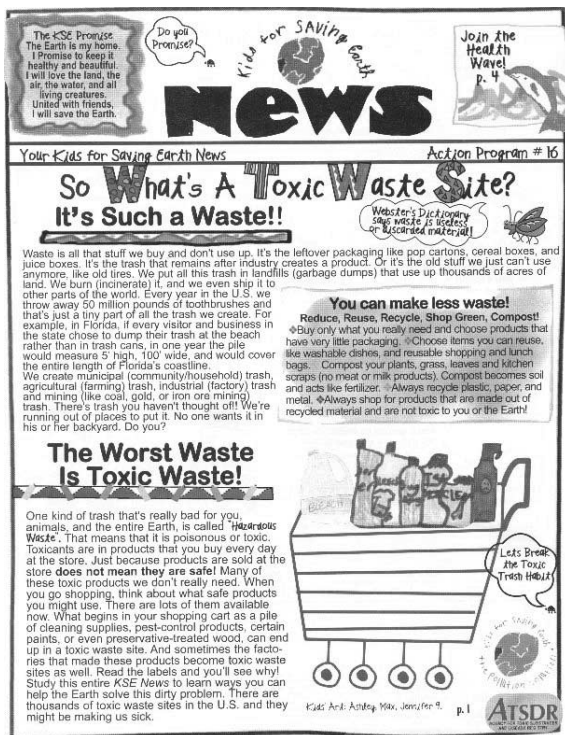
ATSDR, in partnership with the Pennsylvania Department of Health and local mental health personnel in Hazelton, has mounted a response to the significant stress in a Hazelton community affected by indoor air exposures related to a leaking underground gasoline storage tank. Efforts have focused on community education, workshops on community stress for local health care professionals, and support for the community-created Behavioral Healthcare Response team. In addition, a counseling hotline was established for residents. An innovation introduced at this site was a train-the-trainer community stress module. This module enabled the local mental health care personnel to train other local responders in how to handle community stress related to hazardous waste. In addition to the community stress effort, health provider education on the toxic effects of benzene, toluene, ethyl benzene, and xylene (BTEX) was provided during a grand rounds session at the local hospital in Hazelton.

ATSDR's Health Education and Promotion Partnerships

ATSDR has worked with a variety of national organizations since 1989, and conducts many public health education and promotion activities through collaborative projects and partnerships with national organizations of health professionals. These activities build capacity by increasing knowledge of environmental medicine and public health issues for members of the participating organizations and by helping members address the public health concerns of the people and communities they serve. In fiscal year 2001, ATSDR reached more than 80,000 health professionals through its funding of the following 10 national organizations.

- American Academy of Pediatrics (AAP)
- American Association of Occupational Health Nurses (AAOHN)
- American College of Medical Toxicology (ACMT)
- American College of Preventive Medicine (ACPM)
- Association of Occupational and Environmental Clinics (AOEC)
- Association of State and Territorial Health Officials (ASTHO)
- Migrant Clinicians Network (MCN)
- National Alliance for Hispanic Health (the Alliance)
- National Association of County and City Health Officials (NACCHO)
- National Environmental Health Association (NEHA).

An example of projects these national organizations have conducted is a workshop entitled "Establishing a Partnership to Develop an Environmental Safety Net for Children," which the AAP sponsored on March 2–4, 2001, in



Kids for Saving Earth and ATSDR educational outreach

Phoenix, Arizona. More than 100 participants came from academia, private practice, and government and nongovernmental institutions. The workshop gave practicing pediatricians state-of-the-art environmental health information to better serve their patients and their patients' families.

Topics included asthma, neurobehavioral problems, schools that cause or exacerbate illness, use of herbal and folk medicine, risk communication, and international pediatric environmental health issues. AAP offered 19 hours of credit toward the American Medical Association (AMA) Physician's Recognition Award. About 60 physicians received credits in the course. The workshop proceedings will be published as a supplement to the AAP journal *Pediatrics*. AAP established an electronic Safety Net list server

to share environmental health information and to report on member training activities at the state chapter level.

ATSDR has also developed health education and promotion partnerships with tribal governments and consortia through cooperative agreements. These cooperative agreements are intended to develop a variety of environmental health education and training programs for health professions and tribal communities. ATSDR has such cooperative agreements with the Eight Northern Indian Pueblos Council, the Saint Regis Mohawk tribe, the Indian Health Council, the Ely Shoshone Tribe, and Nuclear Risk Management for Native Communities.

Eight Northern Indian Pueblos Council is a nonprofit organization composed of Tesuque, Pojoaque, Nambe, San Ildefonso, Santa Clara, San Juan, Picuris, and Taos Pueblos in Northern New Mexico. The organization will continue its community-based programs to consider the unique environmental health effects facing American Indian children.

The Saint Regis Mohawk Tribe's Tribal Environmental Health Education Activities 2 program is developing a clearinghouse for health study results from environmental health studies conducted in the past 19 years in the Akwesasne Mohawk community. The Indian Health Council (IHC), Inc., is a 30-year-old consortium of nine American Indian tribes in North San Diego, California. IHC will collaborate with health professionals from the University of California, San Diego, Community Pediatrics Division, and the Native American Environmental Protections Coalition to strengthen the council's capacity to develop, implement, and evaluate health education and promotion activities.

The Ely Shoshone Tribe has long been concerned about the effects of the nuclear fallout in Nevada, Utah, New Mexico, Arizona, and

California. The Nuclear Risk Management for Native Communities project will develop a community exposure profile, and grade school and community curriculum modules on nuclear fallout will be written and disseminated to American Indian communities in the area.

Risk Communication and Research Activities

Health risk communication is an emerging area of emphasis and importance at ATSDR and in the broader public health community. Over the past decade, health risk communication has played an integral part in ATSDR's comprehensive efforts to prevent or mitigate adverse human health outcomes related to exposure to hazardous substances. Effective risk communication involves more than merely explaining a health or environmental risk to the public. ATSDR works with its health care partners to develop effective and relevant health communication strategies and messages. Messages are tailored for targeted audience needs (for example, culturally specific, age-specific, or sex-specific).

Communications Training Activities

Several risk communication training activities occurred during 2001. In May 2001, a risk communication workshop was given at the Latin American Child Lead Workshop in Lima, Peru. This meeting was sponsored by the Pan American Health Organization and was attended by representatives of 21 countries. Working groups were formed to discuss recommended approaches to address lead poisoning in Latin America and the Caribbean. An ATSDR staff member coordinated the working group on health risk communication. In August 2001,

ATSDR staff taught a risk communication course at the National Institute of Public Health in Mexico.

Communication Strategies and Message Development for Targeted Audiences

ATSDR, in partnership with Kids for Saving Earth (KSE), is producing materials on communication strategies regarding environmental health. The purpose of this project was to

- develop environmental education relationships with schools that are near toxic waste sites
- educate and empower children and teachers within the KSE network to better understand the earth's environmental problems and to provide them with action-oriented, noncontroversial, and engaging educational materials and activities
- inform children about the role of government agencies in environmental programs.

KSE and ATSDR are working together to expand last year's outreach program to educators and children. KSE will adapt the educational materials so that they are culturally relevant for a Spanish-speaking audience by translating them and inserting appropriate artwork. The materials will be pretested with members of the target audience. Each culturally appropriate set of materials will be mailed to 7,000 schools. Materials will also be created and placed on the KSE, ATSDR Office of Children's Health, and CDC children's and Spanish-language Web pages.

Appendix A:

Sites at Which ATSDR Conducted Activities in Fiscal Year 2001

The following list shows the sites at which ATSDR conducted public health activities in fiscal year 2001, specifically public health assessments, health consultations, health education and promotion activities, health studies, and emergency response activities. Consultations that are not site specific are not listed. The listing uses these abbreviations:

HA = public health assessment

HC = health consultation

HE = health education

HS = health study

EI = exposure investigation

ER = emergency response

Alabama

Alabama Methyl Parathion _____ HE
Anniston Army Depot _____ HC, HE
Anniston Lead Site _____ HE
Anniston PCB Site (Monsanto Co.) ____ HA, HC, HE
Anniston Private Wells _____ HC (2)
B&B Manufacturing _____ HC
Capital City Plume _____ HA
CREMS Water Authority _____ HC, HE
Interstate Lead _____ HE
Knollwood Community _____ HE
Oxford Lake Softball Complex _____ HC
Redwing Carrier _____ HE
Selma Truck Accident _____ ER

Alaska

NE Cape White Alice Site _____ EI
Suqitughneq River Fish Samples _____ HC

Arizona

ASARCO Inc. Hayden Plant _____ HA
Brimhill Sand & Gravel _____ HC
Central Garden and Pet Supply
Warehouse Fire _____ HC
East Washington Fluff Site _____ HC
Franklin Elementary School _____ HA
Litchfield Airport Area _____ HA
Motorola Inc. _____ HE
N. Komelic Well _____ HC
Tucson International Airport _____ HA

Arkansas

Coppermine Lodge/Beaver Lake _____ HC (2)
Koppers Industries Inc. _____ HC
Magobar Mine _____ HC
McNeil Tire Fire _____ ER
Mountain Pine Pressure Treating _____ HA
Red River Aluminum _____ HC
Waldo Fire _____ ER
West Helena Fire _____ ER
West Jacksonville Methyl Parathion _____ HE

California

Alark Hard Chrome _____ HA
Chrome Crankshaft _____ HA, HE
Del Amo/Montrose Chemical _____ HE
Florence Griffith-Joyner School _____ HC
Fort Ord Fire Training Area _____ HC, HE
J&S Chrome Plating _____ HA
Lab for Energy Related Health Research _____ HE
Lava Cap Mine _____ HA
Lawrence Livermore Laboratory _____ HC (3), HE
Laytonville Dump _____ HE
Leviathan Mine _____ HA
Los Angeles Unified School District
Park Avenue School _____ HC
March Air Force Base _____ HA
McFarland Study Area _____ HA
McMinn Superfund Site _____ HC
Omega Chemical Corporation _____ HA
Pacific Gas and Electric _____ HA, HE
Pemaco Maywood _____ HE

Santa Susana Field Lab _____ HE
Sierra Army Depot _____ HE
Sonoma French Cleaners _____ HE
Treasure Island Naval Station _____ HC
West College Avenue/Clover
Drive PCE Area _____ HC (2)
Yolanda Avenue _____ HC

Colorado

ASARCO Globe Plant _____ HE
Cripple Creek & Victor Gold Mining _____ HA, EI, HE
Pueblo Chemical Depot _____ HE
Rocky Flats Plant (DOE) _____ HE
Rocky Mountain Arsenal _____ HS
Vasquez Boulevard and I-70 _____ HE
Vermiculite Facility _____ HE

**Commonwealth of the
Northern Mariana Islands**

Tanapag Village, Saipan _____ EI, HE

Connecticut

Gilbert and Bennett Lagoon Site _____ HC
Hamden Middle School Field _____ HC
Hartford PCBs _____ ER
Holly Hill Resource Facility _____ HC
Inter Royal Corp., Plainfield _____ HE
Newhall Street School _____ HC, HE
Packer Road Landfill _____ HA
Pliny Street _____ HC
Raymark Industries, Inc. _____ HC, HE
Scoville Industrial Landfill _____ HA, HE

Upjohn Chemical Co. _____ HC
Winchester Avenue _____ HC
Yaworski Waste Lagoon _____ HA

Delaware

Standard Chlorine _____ HE

District of Columbia

American University Child
Development Center _____ HC
Spring Valley Chemical Munitions _____ EI, HC, HE
Washington Navy Yard _____ HA, HE

Florida

Alaric Area Groundwater Plume _____ HA, HE
Avon Park Mercury _____ ER
Borden Chemical Co./Tenoric Mine _____ HC (2)
Brown's Dump _____ HE
Callaway & Son Drum Service _____ HA
Cecil Field Naval Air Station _____ HA
Coral Gables Freezer _____ ER
Cuyahoga Wrecking _____ EI
Hunter's Drum and Chemical _____ HE
IMC-AGRICO Co. Four Corners _____ HC
Jacksonville Ash Site _____ HE
Kerr-McGee Chemical Corp. _____ HE
Lonnie C. Miller Sr. Park _____ HC
Nocatee Hull Creosote _____ HA
Pompano Beach Mercury _____ ER
Queens 41 Auto _____ HA
Solitron Devices, Inc. _____ HA, HE

Southern Solvents, Inc. _____ HA, HE
Stauffer Chemical, Tarpon Springs _____ HE
Tallahassee Fire _____ ER
Trans Circuits, Inc. _____ HA
Tuttle Elementary School _____ HC

Georgia

Allied Universal Release _____ HC
Atlanta Rental Property Release _____ ER
Atlanta Thermometer Release _____ ER
Brunswick Wood Preserving _____ HC, HE
Bulk Distribution Centers _____ HC
Cachet Classic Cleaners _____ HC
Chatham County Drug Lab _____ ER
Fayette County Fire _____ ER
Forsyth Tar Paper _____ ER
General Electric _____ HE
Georgia Pacific Paper Mill _____ HE
Hercules _____ HE
Municipal Solid Waste Landfill _____ HC
Newtown Community _____ HA, EI, HE
Oakwood Mobile Home Park _____ HC
Richmond County Health Intervention Project _____ HE
Tri State Steel Drum _____ HE
U.S. Marine Corps Logistics Base _____ HE
Woolfolk Chemical Works, Inc. _____ EI, HE

Guam

Andersen Air Force Base _____ HA
Naval Air Station Agana _____ HE

Hawaii

Oahu Mercury Exposure _____ ER

Idaho

Blackbird Mine _____ HE

Bunker Hill _____ HE

Eastern Michaud Flats _____ HC, HE

Idaho National Engineering Laboratory _____ HE

Kerr McGee Chemical Corp. _____ HE

Monsanto _____ HE

Mountain Home Air Force Base _____ HE

Poles, Inc. Wood Treating Facility _____ HC

Southeast Idaho Phosphate Resource Area _____ HC

Southeast Idaho Selenium Project _____ HE

St. Maries Creosote _____ HE

Triumph Mine Tailings _____ HE

Illinois

Batavia Groundwater Contamination _____ HC

Browning-Ferris Ind. Inc. _____ HA

Cairo Former Manufactured Gas Plant _____ HC

Centralia Former Manufactured Gas Plant _____ HC

Chicago Methyl Parathion _____ HE

Dan Ryan Expressway Fire _____ ER

Diamond Scrap Yard _____ HC

Electron Finishers, Inc. _____ HC

Gebhart Fertilizer Co. _____ HC

Gulf Mobile and Ohio Railyard _____ HA

Ilada Waste Company _____ HC

Jepscor Metals _____ HC

Joliet Army Ammunition Plant
(Load-Assembly) _____ HAJoliet Army Ammunition Plant
(Manufacturing) _____ HA

Koppers Co., Inc., Forest Products Group _____ HA

LaSalle Electric Utilities _____ HS

Lockformer Company _____ HA

Mercury Spills from Gas Regulators _____ HC

MIG/Dewane Landfill _____ HA

Nordic Acres Subdivision Site _____ HC

Pfizer, Inc. _____ HA

Rosiclare Mines _____ HE

Sheffield (U.S. Ecology, Inc.) _____ EI

Southeast Rockford
Groundwater Contamination _____ HA

W.T. Rawleigh Building _____ HC

Warner Electric Brake & Clutch _____ HC

Indiana

Conrail Rail Yard _____ HE

Elkhart _____ HE

Keil Chemical _____ HA, EI, HC, HE

NAD Crane Fire _____ ER

Iowa

Alcoa, Davenport _____ HE

Clinton Coal and Gas _____ HE

Decorah Former Manufactured Gas Plant _____ HC

Economy Products Co., Inc.
Shenandoah _____ HC (3), HE

Former Diller Battery _____ HC (2), HE

Iowa Ammonia Exposure _____ ER

Iowa Army Ammunition Plant _____ HC, HE
Mason City Arsenic _____ HC
Mid-America Tanning Co. _____ HA

Kansas

Chemical Commodities Inc. _____ HC, HE
Easy Serve Oil Refinery Asbestos Site _____ HC
Sherwin-Williams, Coffeyville _____ HE
Sunflower Army Ammunition Plant _____ HA, HE
Tri-County Public Airport _____ HA

Kentucky

Bellevue Park _____ HA, HC
Paducah Gaseous Diffusion Plant _____ HA, HE

Louisiana

Agriculture Street Landfill _____ HE
Calcasieu Estuary, Mossville _____ HC, HE
Central Wood Preserving Co. _____ HA, HE
D. L. Mud Inc. _____ HA
Delatte Metals _____ HA
Doughty's Treating Plant _____ HC
Grand Bois _____ HC, HE
Madisonville Creosote Works _____ HA
Mallard Bay Landing Bulk Plant _____ HA
Marion Pressure Treating _____ HA
Myrtle Grove Trailer Park _____ HE
New Orleans Methyl Parathion _____ HE
Ruston Foundry _____ HA, HC
Southern Shipbuilding _____ HA
Thompson-Hayward Chemical Co. _____ HC

Maine

Bucks Harbor Air Force Radar
Tracking Station _____ HC
Central Maine Disposal Corp. _____ HA

Maryland

Andrews Air Force Base _____ HA
Baltimore Tunnel Fire _____ ER
Beltsville Agricultural Research Center _____ HA
Brandywine DRMO _____ HA
Laurel Radiation _____ ER
Southern Maryland Wood Treatment _____ HE
Spectron _____ HE

Massachusetts

Ashumet Road Well _____ HC
Boston Hydrofluoric Acid _____ ER
Central Street Property _____ HC
College Fire, North Adams _____ ER
Crosby Valve, Inc. _____ HC
Dow Chemical _____ HC
GE Housatonic River _____ HA, HC
Glue Factory Pond _____ HC
Hercules Landfill _____ HA
Johns Pond _____ HC
Nuclear Metals, Inc. _____ HA
Otis Air National Guard Base _____ HC (2), HE
Parker's Island _____ HC
Sandwich and Bourne _____ HC
Sutton Brook Disposal Area _____ HA, HC
W.R. Grace _____ HC

Michigan

Atofina Mercaptans _____ ER
Beard Street School _____ HC
Boyne River Dump _____ HC
Buckley High School Fire _____ ER
Buckley School Mercury Spill _____ HC
Glenview Garden Apartments _____ HC
Kalamazoo River State Property _____ HC
Kingston Development Properties _____ HC
Lafarge Corporation Alpena Plant _____ EI
Laingsburg Former Gas Station _____ HC
Lakeland Hospital Spill _____ ER
Michigan Dept. of Corrections _____ HC
Michigan Tube Company _____ HC
Pucker Street Dam Sediments _____ HC
Ruddiman Drain Area _____ HC
Sandfill Landfill 2 _____ HC
Silver Leaf Paper Co. _____ HC
West Grand Blvd. Mercury Spill _____ HC
Wrenwood _____ HC
Wurtsmith Air Force Base _____ HA

Minnesota

Aitkin Dump _____ HC
American Linen (Ameripride) _____ HA
Battle Lake Dump _____ HC
Big Falls Dump _____ HC
Brainerd Foundary _____ HC
Church Groundwater Plume _____ HC
CMC Heartland Partners Site _____ HC
Cooperative Plating _____ HC

Fish Hatchery Dump _____ HC
Fridley Commons Park Well Field _____ HA
Hibbing Toolhouse _____ HC
Hoeffler Dump _____ HC
Interplastic Corp. _____ HC
Kapperman Dump _____ HC
Lakeland Groundwater _____ HC
Laporte Drinking Water Wells _____ HC
Minnesota Valley Landfill _____ HC
Pechiney Plastic Packaging _____ HC
Tilsner Building _____ HC
Valad Co. Sites _____ HE
Vermillion Dump _____ HC
Western Mineral Products _____ HC, HE
Winona Groundwater _____ HC, HE

Mississippi

Davis Timber Company _____ HA
Indianola Derailment _____ ER
Jackson County Pesticide Sites _____ HE
Web Quarter, Columbia _____ HE

Missouri

Acme Battery Manufacturing _____ HC
Amoco Oil Co. _____ HA, HC, HE
Big River Mine Tailings _____ HE
Cafo Farms _____ HE
Chicago Heights Boulevard VOCs _____ HC
Excelsior Springs Former Manufactured Gas _____ HC
Herculaneum Lead Smelter Site _____ EI, HC, HE
Lake City Army Ammunition Plant _____ HA, HE

Latham Well Site _____ HC, HE
 Madison Mine Site/Harmony Lake _____ HC, HE
 Methamphetamine Labs _____ HE
 National Mine Tailings Site _____ HC
 New Haven Drum Site _____ HE
 Newton County Mine Tailings _____ HE
 Norledge Area _____ HC
 Oronogo-Duenweg _____ HE
 Pediatric Clinic Release _____ ER
 Sentinel Wood Treating Co., Inc. _____ HC, HE
 Wheeling Disposal Service _____ HE

Montana

Alberton Train Derailment _____ HE, HS
 Basin Mining Area _____ HA
 Bitterroot Valley Sanitary Landfill _____ HC
 Libby _____ HC (2), HE, HS
 Lockwood Solvent Ground Water Plume _____ HA, HE
 Milltown Reservoir
 (Deer Lodge, Arrow Stone) _____ HC (2)
 Silver Bow Creek/Butte Area _____ EI
 Silver Fox Subdivision _____ HC
 Upper Tenmile Creek Mining Area _____ HA, HE
 White Pine and Sash _____ HE
 Yankee Doodle Tailings Pond _____ HC

Navajo Nation

Navajo Nation Abandoned Uranium Mines _____ HC

Nebraska

ASARCO, Omaha _____ HE

Atkinson Municipal Water _____ HC
 Dakota City/South Sioux City
 Hydrogen Sulfide _____ HS, HE
 Economy Products Co., Inc., Omaha _____ HC, HE
 Omaha Lead Refining _____ HE
 Omaha Lead Co. _____ HE
 Scottsbluff Train Derailment _____ ER

Nevada

Fallon _____ HE
 Nevada Test Site _____ HE

New Hampshire

Anchor Auto _____ HC
 B and S Leasing Site _____ HC
 Cardinal Landfill _____ HA, HC
 Gendron Junkyard _____ HA, HE
 Mohawk Tannery _____ HA, HE

New Jersey

Brick Township Investigation _____ HA
 Ciba-Geigy Corp. _____ HA, EI, HC, HE
 Cinnamison Township
 (Block 702) Groundwater _____ HA
 Cornell Dubilier Electronics, Inc. _____ HC, HE
 Diamond Head Oil Refinery _____ HA, HC
 Dover Township Landfill _____ HA, EI, HC
 Franklin Burn _____ HA
 Iceland Coin Laundry _____ HA
 Kooltronics, Inc., Rockwell International _____ HC
 Lightman Drum Company _____ HA
 Martin Aaron, Inc. _____ HA

McGuire Air Force Base _____	HE	Greenport-Williamsburg _____	HE
Middlesex Sampling Plant (U.S. DOE) _____	HA, HC, HE	Griffiss Air Force Base _____	HE
Picatiny Arsenal (U.S. Army) _____	HA	Hiteman Leather _____	HA
Puchack Well Field _____	HA	Hudson Technologies, Inc. _____	HA
Quanta Resources Corp. _____	HC	Ithaca Falls Properties _____	HC
RCA Facility _____	HC	Jackson Steel _____	HA
Reich Farms _____	HA, EI, HC, HE	Johnny Cake Road Farm Site _____	HC, HE
Silverton Wells _____	HA	Jones Chemicals Inc. _____	HC
United Water, Toms River _____	HC	Lawrence Aviation Industries, Inc. _____	HA
Woodbrook Road Dump _____	HE	Lehigh Valley Railroad _____	HA
		Li Tungsten Corp. _____	HC, HE
New Mexico		Liberty Industrial Finishing _____	HE
AT & SF _____	HE	Little Valley _____	HA
Cerro Grande Fire _____	HC	New York City Spill _____	ER
Fruit Avenue Plume _____	HA	Old Roosevelt Field _____	HA
Highway 549 Solvents _____	HC	Peter Cooper Corporation (Markhams) _____	HA
Jicarilla Apache Reservation _____	HC (2)	Plattsburgh Air Force Base _____	HA
Los Alamos Hydrofluoric Acid _____	ER	Shenandoah Road Groundwater _____	HE
Los Alamos Scientific Laboratory _____	HE	St. Regis Mohawk Drinking Water _____	HC
North Railroad Ave. Plume _____	HE	Union Spring Groundwater _____	HC
Santa Fe Dorms _____	HE	United Plating _____	HE
		Village of Liberty Water Supply _____	HE
		Waterford, Hudson River PCBs _____	HS
		World Trade Center _____	ER, HE
New York		North Carolina	
Abby Street Hickory Wood Subdivision _____	HC, HE	Aberdeen Pesticide Dumps _____	HA
Anitec Image Corp. _____	HA	Barber Orchard _____	HE
Cayuhoga Groundwater _____	HE	Carolina Solite Corp./Aquadale _____	HA, HE
Colesville Municipal Landfill _____	HC	Geigy Chemical Corp. (Aberdeen Plant) _____	HA
Computer Circuits _____	HA		
Cross County Sanitation Landfill _____	HA		
FMC Dublin Road _____	HE		
Fresh Kills Landfill _____	HE		

Georgia-Pacific Corporation
Hardwood Sawmill _____ HA
Glenola _____ HS, HE
North Belmont PCE Site _____ HC
Paw Creek Bulk Petroleum
Distribution Terminals _____ HC
Raleigh Thermometer _____ ER
Sigmon's Septic Tank Service _____ HC

Ohio

Brush Wellman, Inc., Elmore _____ HE
Cady Road Area _____ HC
Dayton Tire and Rubber Co. _____ HC
Eagle Picher _____ HA
Fayette Tubular Products _____ HC (2)
Fernald (Feed Materials) _____ HE, HS
Grant Medical Center _____ ER
Kirby Tire Company _____ HA
Laboratory Cyanide Spill _____ ER
Marion Engineer Depot _____ HE
North Sanitary Landfill _____ HA, HE
Norwood Radiator Site _____ HC, HE
Ottawa River _____ HC
Tiffin Landfill _____ HC (2)
United Technologies _____ HC (2)
Wadsworth Road _____ HC (2)
Waste Technologies _____ HE

Oklahoma

Imperial Refining Company _____ HA
Tulsa Release _____ ER

Oregon

Carpenter Lane Pesticides _____ HE
Oregon State Penitentiary _____ EI
Taylor Lumber & Treating _____ HE

Pennsylvania

Allister Co. Site _____ HC
Arch Avenue _____ HC
Avco Lycoming _____ HE
Cartex Site _____ HE
Doorma Door Controls, Inc. _____ HC
Eastern Diversified Metals _____ HC, HE
Flight Systems, Inc. _____ HC
Foamex Products _____ HC
Hamburg Lead Site _____ HE
Hazelton City Landfill _____ HC, HE
High Quality Polishing _____ HC
ICI Americas Inc. _____ HE
Irwin PCBs _____ ER
Landis Lane Site _____ HE
Lake City VOC Site _____ HC
Lower Darby Creek Area _____ HA, HC
Malter International Specialty Chemical _____ HC
Molycorp, Inc. _____ HA, HE
Naval Air Development Center _____ HA
Navy Ship Parts Control Center _____ HE
Occidental Chemical _____ HE
Old Wilmington Road _____ HA
Orthodox Street Site _____ HC
Region 3 Mercaptans _____ ER
Rich Farms Nursery Fire _____ ER

Safety Light _____	HE	Warren Street _____	HC
S MDF _____	HE		
Titanium Wire Corp. _____	HC	Tennessee	
Toll Brothers _____	HE	Jersey Miniere Zinc Co. _____	EI
Tranguch Gasoline Site _____	HC, HE	Memphis Defense Depot _____	HA, HE
Valmont TCE _____	HE	Memphis Methyl Parathion _____	HE
Watson Johnson Landfill _____	HC, HE	Oak Ridge National Laboratory _____	HE
		Signal Mountain Vandals _____	ER
Puerto Rico		Stauffer Chemical _____	HE
Isla De Vieques Bombing Range _____	HA	Volunteer Army Ammunition Plant _____	HC, HE
Juncos Landfill _____	HE		
Scorpio Recycling, Inc. _____	HA	Texas	
Vega Baja Landfill _____	HE	Arroyo Colorado Channel _____	HC
Vieques _____	HE	Austin Fire _____	ER
		BFI-Tessman Road Stock Tank _____	HC
Rhode Island		Brazoria Fire _____	ER
Central Landfill _____	HE	Brownsville Ship Channel _____	HC
Davisville Naval Construction Battalion _____	HA, HE	Christmas Bay Complex _____	HC
Kingston Mercury _____	ER	Clear Lake _____	HC
		Corpus Christi Landfills _____	HC, HE
South Carolina		East Galveston Bay _____	HC
Aqua-Tech Environmental, Inc. (Groce Labs) _____	HA	El Paso County Metal Survey _____	HC (4)
Berkeley County Tire Fire _____	ER	Garland Creosoting _____	HA
Buford Naval Hospital _____	ER	Hart Creosoting Company _____	HA
Fountain Inn Subdivision _____	EI	Houston Spill _____	ER
Koppers Co., Inc., Charleston _____	HE	Kelly Air Force Base _____	HA, HC, HE
MacAlloy Corporation _____	HA, HE	Kingsbury Metal Finishing _____	HC
Red Bank Creek _____	HC	Lakewood Addition _____	HC
Savannah River Site _____	HC, HE	Malone Service Co. Swan Lake Plant _____	HA
Simpsonville _____	HE	NL Industries _____	HE
Spartanburg Sulfuric Acid _____	ER	Old Brazos Forge _____	HC

Palacios Neon Sign _____ HC
 Palmer Barge Line _____ HA
 Southside Hospital Landfill _____ HC
 Star Lake Canal _____ HA
 State Road 114 _____ HA
 Tex-Tin Corp. _____ HE
 Texas Methyl Parathion Sites _____ HE
 Trinity Bay _____ HC
 Trinity River _____ HC
 Tropical Storm Allison _____ ER
 Upper Galveston Bay _____ HC
 Waste Facilities, Inc. _____ HC
 West Dallas Lead _____ HE
 West Galveston Bay _____ HC

Utah

Davenport and Flagstaff Smelter _____ HE
 Eureka Mills _____ EI, HE
 Hill Air Force Base _____ HE
 Intermountain Waste Oil Refinery _____ HA, HE
 International Smelter _____ HE
 Jacobs Smelter _____ HA
 Staker Paving Asphalt Production Plant _____ EI
 Tooele Army Depot _____ HE

Vermont

Elizabeth Mine _____ HC (2), HE
 Lakeside Community Sites _____ EI
 Pownal Tannery _____ HA

Virgin Islands

Monroe and Sibilly Elementary Schools _____ HE

Virginia

Avtex Fibers _____ HE
 Kim-Stan Landfill _____ HA
 Leesburg Formaldehyde _____ ER
 Naval Weapons Station, Yorktown-Cheatham _____ HC
 Pentagon Attack _____ ER
 Saltville Waste Disposal Pond _____ HE
 St. Juliens Creek Annex _____ HC
 University of Virginia Hospital _____ ER
 V&V Mining PCB Site _____ HC, HE

Washington

B and L Woodwaste Landfill _____ HC
 Basin Oil Co. _____ HC
 Beacon Battery _____ HC
 Belltown P-Patch _____ HC
 Boise Cascade Landfill _____ HA, HC
 Boomsnub/Airco _____ HA, HC
 Burlington Northern _____ HE
 Cascade Pole & Lumber Co. _____ HC, HE
 Chevron Bulk Terminal _____ HC
 Forest Napavine Road and Jackson Highway _____ HC
 Georgia Pacific Pulp and Paper Mill _____ HC
 Hamilton/Labree Roads _____ HA
 Hanford Nuclear Reservation _____ HS, HE
 Indianola Landfill _____ HC
 J. H. Baxter Wood Treating Facility _____ HC
 Lake Roosevelt _____ HC

Long Painting _____	HE	Vienna Tetrachloroethene _____	HA
Lower Duwamish Waterway _____	HC, HE	West Virginia Dairy _____	ER
Malarkey Asphalt Co. _____	HC		
Midnight Mine _____	HE	Wisconsin	
Millcreek Fire _____	HC	Ashland NSP Lakefront _____	HE
Montesano Tar Pits _____	HC	Badger Army Ammunition _____	HE
Naval Undersea Warfare Engineering Station __	HA	Crossroads at Big Creek _____	HC
North 27th Street _____	HC	Equity Cooperative/Amery Fertilizer _____	HC
Oeser Company _____	HE	Illegal Methamphetamine Lab _____	HC
Old Mill Town Mall _____	HC	Koppers Industries, Inc. _____	HC
Philip Services Corp. _____	HC (2)	Mobile Blasting Brownfield Site _____	HC
Quincy High School _____	HC	Northwestern Barrel _____	HE
Roderick Timber Property _____	HC	Oshkosh Boxcar Release _____	ER
South Park Neighborhood _____	HC	Racine Mercury _____	ER
Upland Soils and Sedimentation		Riverside Plating _____	HC
Kah Tai Lagoon _____	HC (2)	Siren Tornado/Crooked Lake _____	HC
Wheat Stubble Burning _____	HE	Try Chemical Corporation _____	HC
Wolph's Secondhand Store Site _____	HC	U.S. Army Badger Army Ammunition Plant __	HC
Y Road Landfill _____	HC (2)	Westby Area School District _____	HC

West Virginia

Big John Salvage — Hoult Road _____	HA
Flexsys/Solutia Plant _____	HE
Holmes and Madden Landfill _____	HE
Inwood Tire Fire _____	HC
Kanawha Motive Power _____	HC
Manilla Creek Landfill _____	HC (2)
Poca Drum Dump _____	HC
Princeton Enterprises _____	HC
Shaffer Equipment Co. _____	HE

Appendix B:

Toxicological Profiles

Prepared in Fiscal Year 2001

CERCLA

Final

Asbestos (Update)
Arsenic (Update)
Benzidine (Update)
Chromium (Update)
1,2-Dichloroethane (Update)
Di-n-butyl phthalate (Update)
Endosulfan (Update)
Ethion
Manganese (Update)
Methylene chloride (Update)
Methyl parathion (Update)
Pentachlorophenol (Update)
Polychlorinated biphenyls (Update)
Toluene (Update)

Public Comment Draft

Aldrin/Dieldrin (Update)
Beryllium (Update)
Creosote (Update)
DDT/DDE/DDD (Update)
Di(2-ethylhexyl phthalate)
Hexachlorobenzene (Update)
Methoxychlor (Update)

Under Development

Atrazine
Flurides (Update)
Malathion
Mustard Gas
Perchlorates
Pyrethrins/Pyrethroids
Selenium (Update)

U.S. Department of Energy

Public Comment Draft

Americium
Cesium
Cobalt (Update)
Iodine
Strontium

Appendix C:

ATSDR Resources on the Internet

ATSDR has many documents on its Internet site that provide information about specific sites, substances, agency programs, and activities. These include full public health assessments for a number of sites, easy-to-read fact sheets on toxic substances (ToxFAQs), and case studies for health care professionals. ATSDR's Internet address is

www.atsdr.cdc.gov

Some of the resources available on the web site are listed below.

2001 CERCLA Priority List of Hazardous Substances

A Primer on Health Risk Communication Principles and Practices

A Shared Vision for Environmental Public Health at CDC/ATSDR

Alaska Native Subsistence and Dietary Contaminants Program

An Evaluation Primer on Health Risk Communication Programs and Outcomes

ATSDR 2002–2007 Strategic Plan

ATSDR FY 1999 Profile and Annual Report

ATSDR FY 2000 Profile and Annual Report

ATSDR Cancer Policy Framework

ATSDR National Alerts—Toxic Substances

ATSDR Public Health Advisories

ATSDR Public Health Assessments

ATSDR Science Corner

ATSDR Statement of Values

ATSDR's Most Frequently Asked Questions

Case Studies in Environmental Medicine

Community Involvement Pages

Community Matters: About ATSDR

Community Matters: Exposure

Community Matters: Find Out About Sites in Your Community

Community Matters: Information for Communities

Community Matters: Resources and Contacts

Community Matters: Search for a Specific Chemical

Community Matters: The ATSDR Ombudsman

Community Matters: What You Can Expect from ATSDR

Congressional Testimony: Medical Monitoring at Hanford Nuclear Facility

Congressional Testimony: The Scientific Aspects of Mercury

Dioxin and Dioxin-Like Compounds in the Soil, Part 1, ATSDR Interim Policy Guideline

GATHER interactive map server

Great Lakes Human Health Effects Research Program

Hazardous Substances and Public Health Newsletter

Hazardous Substances Emergency Events Surveillance (HSEES) Annual Report 1997

HazDat Site Activity Query Map

Landfill Gas Primer

Malathion: Chemical Technical Summary for Public Health and Public Safety Professionals

Methyl Parathion Expert Panel Report

Mississippi Delta Project

Organizational Chart of ATSDR

Peer Reviewed Scientific Papers

Public Health Concerns at Department of Energy Sites

Public Health Implications of Dioxins

Public Health Implications of Exposure to Polychlorinated Biphenyls (PCBs)

Public Health Statements on various hazardous substances

Report of the Expert Panel Workshop on Psychological Responses to Hazardous Substances

Substances Most Frequently Found in Completed Exposure Pathways—1999

The Toxicologic Hazard of Superfund Hazardous Waste Sites

Top 20 Hazardous Substances—ATSDR/EPA Priority List 1999

ToxFAQs

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