ATSDR

AGENCY FOR TOXIC SUBSTANCES
AND DISEASE REGISTRY

Public Health Concern At Department of Energy Sites

ATSDR's Public Health Response

Progress Report

October 1998

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Atlanta, Georgia

BACKGROUND

The Agency for Toxic Substances and Disease Registry (ATSDR) is a public health agency within the U.S. Department of Health and Human Services. Created by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or Superfund) of 1980, 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 present in the environment.***

ATSDR was established by Congress to conduct public health assessments at all Superfund sites, including federal facilities, and to conduct any needed follow-up health activities, such as health studies, registries, medical monitoring, and health education. Through its programs and by working with other federal, state, and local government agencies, ATSDR acts to protect public health.

ATSDR (Agency for Toxic Substances and Disease Registry) is a federal agency created in 1980 by the Superfund legislation. ATSDR's responsibilities include helping to prevent or reduce exposures to toxic chemicals found in the environment, prevent illnesses that result from any exposure, and expand knowledge about the health effects of exposures to hazardous substances.

CERCLA mandated that ATSDR determine the extent of danger to public health from a release or threatened release of a hazardous substance, establish a National Exposure and Disease Registry, create an inventory of health information on hazardous substances, and determine the relationship between hazardous substance exposure and illness. CERCLA also directed ATSDR to develop a list of hazardous substances found at NPL sites and to prepare toxicological profiles on each of those substances. The Superfund Amendments and Reauthorization Act (SARA) of 1986 greatly expanded ATSDR's responsibilities for public health assessments, toxicological databases, information dissemination, and medical education. SARA mandated that ATSDR conduct a public health assessment of all sites proposed for listing on the Environmental Protection Agency's (EPA's) National Priorities List (NPL) and that ATSDR conduct additional follow-up health studies if needed.

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This Progress Report highlights the activities and accomplishments of the Agency for Toxic Substances and Disease Registry (ATSDR) in addressing public health issues in the communities near Department of Energy sites. These accomplishments could not have been achieved without coordination and collaboration with the community and other groups (i.e., state and local health departments; tribal nations; labor representatives; faculty and graduate students of universities; and the EPA's National Air and Radiation Environmental Laboratory).

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Highlights

The following pages highlight the activities and accomplishments of ATSDR in addressing public health issues in the communities near Department of Energy sites.

ATSDR's Health Activities Benefit Communities and DOE

ATSDR's activities have helped protect public health for communities near DOE facilities. The agency's activities at DOE sites have identified significant adverse health outcomes, the need for additional health studies, inadequacies in monitoring equipment, and people at risk because of exposure. ATSDR's public health assessments and health consultations have made recommendations to mitigate exposures, conduct health studies, and further categorize environmental releases.

Reduces Exposure

In 1993, ATSDR reviewed DOE documents for the Maywood Interim Storage Site and adjacent commercial properties in New Jersey. ATSDR determined that DOE was not monitoring for a main daughter product of thorium-232, a contaminant of concern at the site. ATSDR recommended in a health consultation that DOE monitor for this daughter product, radon-220. In May 1997, DOE notified ATSDR that, as a result of the health consultation, DOE had tested for radon-220 and found elevated levels at some locations. Clean-up efforts have reduced concentrations to levels within DOE limits at some locations. Approximately 500 persons were potentially affected.

Prevents Disease

ATSDR is working to protect public health at another DOE facility, the Hanford Nuclear Reservation in southeastern Washington State. During 1945–1951, substantial amounts of iodine-131 were released from this facility. Many young children were exposed to large doses of this radioactive substance, placing them at lifetime risk for thyroid cancer. In February 1997, ATSDR approved the implementation of the Hanford Medical Monitoring Program, which will provide a medical evaluation and referral service for 14,000 eligible persons who are now at increased risk for thyroid neoplasms and other thyroid and parathyroid conditions. This program will save lives because of earlier detection of thyroid cancer and other thyroid/parathyroid diseases. DOE recently agreed to provide $5 million in 1998 to initiate the program.

In response to community concerns about health problems, ATSDR is also developing an iodine-131 subregistry for people exposed as young children to releases from the Hanford Nuclear Reservation. As part of the National Exposure Registry, the program will collect baseline data and obtain periodic updates on a wide range of possible health problems in addition to thyroid disease. Important benefits of this program will include addressing specific community health concerns, providing valuable information to registrants about their health, and increasing knowledge about the health effects of iodine-131 exposure.

Some other examples of ATSDR's public health activities at DOE sites follow.

- In 1997, ATSDR provided technical assistance to emergency personnel when a 400 gallon tank containing nitric acid exploded at the Hanford Plutonium Finishing Plant. On the basis of the symptoms reported by the 10 men who were present at the accident (e.g., sore throats and a metallic taste), ATSDR concluded that the nitrogen dioxide exposure was greater than that calculated by DOE. ATSDR advised the emergency room physician and DOE staff that the men exposed are still at risk for fatal complications, even if they initially seemed unaffected. Often, no symptoms occur, except a slight cough, fatigue, and nausea. However, potentially fatal pulmonary edema can occur following minimal early symptoms. Nitrogen dioxide can react with fats in cell membranes, causing damage to lung cells and pulmonary macrophages and resulting in decreased lung function and reduced resistance to pulmonary infections. The second stage involves abrupt development of fever and chills, more severe dyspnea, cyanosis, and pulmonary edema. Recovery can be complete, or it could involve some degree of impaired pulmonary function. The workers needed close observation for at least several weeks, because symptoms of exposure to nitrogen dioxide sometimes are not initially apparent. There can be a late onset of adverse health effects, and fatal symptoms might not appear for several weeks. This concern was heightened after one of the men reported renewed symptoms. On the basis of ATSDR's recommendation, DOE agreed to provide follow-up monitoring for 6 months.

- As part of the public health assessment for the Monticello, Utah, Mill Tailings Site, ATSDR's review of health outcome data identified a 287% increase in breast cancer mortality; a 395% increase in deaths attributed to trachea, bronchus, and lung pleura cancers; and the highest renal failure rate for Utah. Based on results from an updated cancer statistics review, an assessment of end-stage renal disease incidence in San Juan County, and a potential case-series analysis of end-stage renal disease, ATSDR staff will collaborate with community representatives to determine the feasibility and interest in conducting epidemiologic studies of selected cancers or end-stage renal disease.

- ATSDR conducted an exposure investigation to determine if people who eat fish or turtles from the Watts Bar Reservoir are exposed to elevated levels of polychlorinated biphenyls (PCBs) and mercury from the Oak Ridge, Tennessee, site. Only 5 (4%) of the 116 people tested had elevated levels of PCBs in their blood, and one person had an elevated level of mercury in the blood. Follow-up counseling was provided to those who had elevated levels. As part of its activities at Watts Bar, ATSDR also developed and distributed a brochure informing consumers about fish covered by the Watts Bar fish advisory and giving tips about the safest ways to prepare fish. In addition, ATSDR conducted education programs for local health care providers about the health risks associated with eating PCB-contaminated fish.

- ATSDR is developing health studies at DOE sites that will provide important information on human health risks resulting from hazardous substance exposures. At Oak Ridge, Tennessee, the exposure information on PCBs, mercury, cesium, iodine, and uranium will be reviewed to determine the need for health studies and their feasibility. At the Fernald site in Ohio, the medical monitoring program database will be analyzed to determine if health follow-up activities are indicated. At the Paducah Gaseous Diffusion Plant in Kentucky, ATSDR will assess the feasibility of a health study to investigate trichloroethylene and other hazardous substances.

Educates Health Care Providers

ATSDR conducted a grand round on the health risks associated with eating PCB-contaminated fish. Physicians in the Oak Ridge area who specialize in family practice, obstetrics and gynecology, and pediatrics were mailed invitations to the grand round presentation and copies of *ATSDR Case Study in Environmental Medicine—Polychlorinated Biphenyls* and *Taking an Exposure History*. Health care providers obtained Continuing Medical Education (CME) credits after successfully completing the test at the end of the case study.

ATSDR sponsored a workshop in May 1995 in Miamisburg, Ohio, for health professionals and interested community members. The purpose of the workshop was to educate and discuss with attendees the types of studies epidemiologists conduct, the kinds of statistics used in public health, the types of health conditions that may be associated with environmental contaminants, and the means by which public health professionals use information gathered from citizens. Twenty-one nurses and radiological technicians each received 6 contact hours of CME credits. ATSDR developed the workshop and arranged for the CME units through the Boston University School of Public Health. Boston University professors presented at the workshop. Participants included representatives of local area hospitals, Miamisburg Environmental Safety and Health, Fernald Residents for Environmental Safety and Health, the Ohio Department of Health, the Ohio Environmental Protection Agency, the Regional Air Pollution Control Agency, the Community Organizing Center, Wright State University, Antioch College, and other interested persons.

Assists Tribes and Communities

ATSDR developed Community Information Sharing Sessions on radiation and health in conjunction with EPA's National Air and Radiation Environmental Laboratory to educate and assist the community near the Monticello Mill Tailings Site and the Monticello Vicinity Properties Site. The sessions were conducted in Monticello and Blanding, Utah, April 24–27, 1995, with school-aged children (elementary, middle, and high school) and adults in the community, the White Mesa Ute Indians, and the Blue

Mountain Dineh Indians. Approximately 1,228 persons attended the sessions, at which ATSDR actively engaged community members in health education activities. Exposure to radiation and other public health concerns were discussed in an open forum at the sessions. ATSDR provided age-appropriate materials (e.g., coloring books, comic books, and informational books) to meeting attendees.

Benefits to DOE Decision Making and Cost Savings

ATSDR public health activities benefit DOE as well as protect public health. For example, at the DOE Oak Ridge site, an ATSDR health consultation determined that a clean-up level of 400 parts per million (ppm) of mercury in the East Fork Poplar Creek soil and flood plain would be protective of public health. The EPA, DOE, and the state environmental agency had initially determined that DOE should clean the soil to a level of 50 ppm of mercury. Because the chemical form and bioavailability of the mercury was unclear, ATSDR convened a panel of scientists who had expertise in mercury speciation and bioavailability. As a result of this effort, ATSDR determined that (1) the mercury present in the East Fork Poplar Creek was not readily bioavailable and (2) a clean-up level of 400 ppm mercury was protective of public health. As a result of this determination, DOE saved more than $100 million.

Through the use of ATSDR's toxicological profiles, DOE will be able to make better informed safety and health decisions for its sites. Toxicological profiles for uranium and ionizing radiation are being completed to provide DOE with a foundation for assessing the health effects of uranium and substances associated with ionizing radiation. They will also identify health effects associated with each substance, other key data, and any significant data needs. The toxicological profiles are used by health professionals as an authoritative source of current information on the health effects of hazardous waste components. In addition, these profiles are used to aid health assessors working at hazardous waste sites and to inform the public about potentially hazardous substances.

In addition to developing toxicological profiles, ATSDR's activities at DOE sites thus far have included issuing public health assessments for 14 sites and conducting 53 health consultations at 28 sites (i.e., some sites had multiple consultations).

Support for the Future

ATSDR is committed to using public health science and epidemiology to help DOE and other federal agencies make effective decisions—both in terms of costs and public health. In support of these goals, ATSDR will conduct the full range of public health services mandated under CERCLA for communities potentially exposed to hazardous substances released into the environment from DOE Superfund sites.

For more information on ATSDR's public health activities at DOE sites, call **(888) 42-ATSDR [(888) 422-8737]** or visit the ATSDR homepage at **http://atsdr1.atsdr.cdc.gov:8080/**.

Establishment of Health Effects Subcommittees to Advise ATSDR

Implementing public health service activities and research at DOE sites requires substantial interaction with communities in close proximity to the sites. In 1994, ATSDR and the Centers for Disease Control and Prevention (CDC) established Health Effects Subcommittees (HES) for the Hanford, Fernald, Savannah River, and Idaho National Engineering and Environmental Laboratories. Each HES is a representative and knowledgeable body of residents and Native Americans, which provides advice and recommendations to the director of CDC and administrator of ATSDR regarding community, Native American Tribes, and labor concerns pertaining to the activities of the agencies. ATSDR has the administrative lead for the Hanford Health Effects Subcommittee, and CDC's National Center for Environmental Health has the administrative lead for the other three sites. The Hanford HES provided critical advice and recommendations for ATSDR's Hanford Medical Monitoring Program, Iodine-131 Subregistry, and Hanford Public Health Assessments.

Needs Assessments at Hanford, Savannah River, and Los Alamos

Needs assessments are critical in the design to build capacity within a community by addressing the environmental concerns of affected community members and providing direct input on decisions concerning the health issues related to site releases.

At the Hanford site, ATSDR has entered into nine separate cooperative agreements, one with each of the nine federally recognized Native American tribes that live near the site, for the purpose of building tribal capacity to address environmental health issues related to hazardous waste releases at Hanford. These cooperative agreements are anticipated to be 5-year projects, with funding in years 2–5 to be based on a work plan currently being developed by the nine Tribes.

ATSDR has conducted needs assessments for multiple communities in the Los Alamos area, including the Eight Northern Pueblos and Hispanic communities near the site. In FY 1998, ATSDR began implementing the health education activities identified in the needs assessment to inform residents in communities near the laboratory about hazards related to radiation exposure. In FY 1999, ATSDR will continue community and professional health education. ATSDR health education activities assist the community in understanding the effects of exposure to low doses of contaminants. Health education will increase the community's knowledge about potential exposures and, therefore, reduce adverse health effects and diminished quality of life resulting from exposure to hazardous substances in the environment.

ATSDR has conducted needs assessments for communities in the Savannah area. In FY 1999, ATSDR will prepare needs assessments for additional communities. In FY 1999, ATSDR will continue health education activities identified in the needs assessments.

Engaging DOE Site-Specific Advisory Boards

ATSDR participates in existing DOE Site-Specific Advisory Boards to facilitate collaboration and essential information exchange between ATSDR and communities; tribal governments; and local, state, and other federal agencies involved at sites served by ATSDR. For example, ATSDR's service as an ex-officio member of the Fernald Citizens' Advisory Board enabled the timely exchange of information on the shortcomings of the Fernald ambient radon monitoring program and quick response by DOE to correct the situation. The Pantex Citizens' Advisory Board provided input during the public health assessment process and helped to identify demographics and specific diseases of concern to the community.

Public Health Framework

When investigating possible associations between hazardous substances in the environment and adverse health effects in a community, ATSDR follows a public health framework that includes

- involving the community and other stakeholders;
- characterizing and evaluating environmental contaminants;
- assessing toxicity;
- conducting epidemiologic studies and activities;
- providing community-based education; and
- designing and implementing public health interventions.

For DOE sites, these activities are conducted in partnership with community groups and local, state, and federal agencies.

Exposure Investigation at Oak Ridge, Tennessee

In September 1997, ATSDR screened more than 500 persons and obtained blood samples from 116 persons who met the criteria and volunteered, including 13 residents of the Scarboro community. These participants were interviewed, and blood samples were obtained for analyses of serum PCBs and blood mercury. In November 1997, ATSDR sent all participants written notification and interpretation of their individual results. In December 1997, an ATSDR physician conducted follow-up interviews with participants identified as having elevated values. During March 16–19, 1998, ATSDR held public meetings in Oak Ridge, Kingston, and Spring City to discuss the results of the exposure investigation.

An exposure investigation is a very focused public health approach ATSDR uses to learn if people are being exposed to (i.e., coming in contact with) chemicals in the environment at levels that could affect their health. Information can be gathered in three ways during an exposure investigation: biomedical testing (e.g., testing blood or urine samples); environmental testing (e.g., testing air or groundwater samples); and using computers to estimate contaminant levels at which people have been or might be exposed.

Findings:

1. Participants in the exposure investigation had serum PCB levels and blood mercury levels similar to levels found in the general population.

2. Only five (4%) of the 116 persons tested had PCB levels that were greater than 20 micrograms per liter (µg/L) or parts per billion (ppb), which is considered to be an elevated level of total PCBs. Four of the five participants whose levels exceeded 20 µg/L had levels between 20 and 30 µg/L. Only one participant had a serum PCB level of 103.8 µg/L, which is higher than levels generally found.

3. Only one participant in the exposure investigation had a total blood mercury level greater than 10 µg/L, which is considered elevated. The remaining participants had mercury blood levels that ranged up to 10 µg/L, as might be expected in the general population.

Public Health Assessments and Health Consultations

Public health assessments identify populations potentially exposed to hazardous substances released into the environment, and they serve as a triage for necessary public health interventions (e.g., health studies, exposure registries, health promotion, and medical monitoring). ATSDR has issued public health assessments at 14 DOE sites and is currently drafting assessments for 8 sites. ATSDR plans to initiate public health assessments for 3 sites for which it has prepared health consultations.

The public health assessment assesses the potential public health impact of off-site releases of hazardous materials. Pathways of concern may be addressed as a series of health consultations

that will be compiled in the public health assessment. Potential exposure pathways include groundwater, surface water, air, soil, and biota. Examples of health consultations include assessing potential adverse health effects associated with contaminated groundwater (e.g., at Fernald, Ohio, nonpotable water uses; Brookhaven, New York, TCE and tritium; and Los Alamos, New Mexico, nitrates and tritium) and biota (e.g., at Fernald, Ohio, produce and milk; Weldon Spring, Missouri, fish; Oak Ridge, Tennessee, fish and turtles; and Laboratory for Energy-Related Research, California, fish). Health consultations may also be used to address specific questions related to a site not on the NPL. Examples include Alba Craft, Ohio (i.e., radiological contamination in the nearby residential area); Cape Thompson, Alaska (cancer incidence); Lawrence-Berkeley National Laboratory, California (risk assessment for tritium); and West Valley Demonstration Project, New York (environmental impact statement).

A health consultation is an analysis that provides information and recommendations on a specific public health issue related to potentially hazardous materials. An exposure pathway (i.e., breathing air or eating soil) is analyzed by reviewing and interpreting environmental data, community health concerns, and, if available, biomedical testing information. Recommendations protective of human health are frequently listed in health consultations.

Science Panel on the Bioavailability of Mercury

The panel produced three technical papers and an ATSDR overview paper that were published in *Risk Analysis*. The science panel identified methods and strategies that enabled health assessors to develop data-supported, site-specific estimates of the bioavailability of inorganic mercury and other metals (e.g., arsenic and lead) from soils. The panel comprised private consultants and academicians internationally known for their metal bioavailability research and experts from ATSDR, CDC, the National Institutes for Health, and EPA. The results of the panel meeting, which was held in August 1995, and published analyses of bioavailability of mercury influenced the characterization and evaluation of the East Fork Poplar Creek Site and other waste sites with mercury in soil.

At East Fork Poplar Creek, Oak Ridge, Tennessee, DOE was able to change the remediation goal from 50 ppm to 400 ppm mercury on the basis of information generated by the ATSDR Science Panel on the Bioavailability of Mercury. This action resulted in DOE cost savings of more than $100 million dollars.

Toxicological Profiles, Public Health Statements, and ToxFAQs

ATSDR prepares toxicological profiles for hazardous substances that pose the most significant potential threat to human health at NPL sites. ATSDR has published toxicological profiles for 250 substances, including plutonium, radium, radon, thorium, uranium, and ionizing radiation. Profiles will be available soon for iodine-131 and cesium. The next priorities for toxicological profiles are tritium, strontium, and cobalt. In the more distant future, profiles are planned for americium, technetium, noble and activation gases, and vanadium. Updated profiles are planned for plutonium, radium, thorium, and radon. The profiles reflect ATSDR's assessment of all relevant toxicological testing and information that has been peer reviewed, and they are intended to characterize succinctly the toxicological and adverse health effects information for the hazardous substance being described. Each profile identifies and reviews the peer-reviewed literature and describes a hazardous substance's toxicological properties. Through the use of ATSDR toxicological profiles, risk managers are able to make more informed safety and health decisions.

ATSDR Public Health Statements Provide Essential Information About Hazardous Substances

- ☐ What is the substance?
- ☐ How might I be exposed to it?
- ☐ How can it enter and leave my body?
- ☐ How can it affect my health?
- ☐ Is there a medical test to determine if I have been exposed to it?
- ☐ What levels of exposure have resulted in harmful health effects?
- ☐ What recommendations has the federal government made to protect human health?
- ☐ Where can I get more information?

Each toxicological profile begins with a public health statement that describes, in nontechnical language, a substance's relevant toxicological properties, levels of human exposure, and any known adverse health effects. The adequacy of information used to determine these health effects is described in a summary. Data needs that are of importance to the protection of public health are identified.

ToxFAQs, which are similar to public health statements, are available at ATSDR's World Wide Web site (**http://atsdr1.atsdr.cdc.gov:8080/**).

Iodine-131 Subregistry

The subregistry will enable determination of the association between excess occurrences of adverse health outcomes by level and time period of iodine-131 exposures. The subregistry will assess more than 40 possible health outcomes, including thyroid conditions, and will address the many community health concerns about exposures at the Hanford site.

Approximately 17,000 persons will be enrolled in this ongoing health study of childhood exposure to the radioactive releases from Hanford. The subregistry will assess the potential adverse health effects of iodine-131 exposure on (1) persons born in Adams, Benton, or Franklin counties during 1940–1951 and (2) persons who were less than 6 years of age and lived more than 30 days in these counties during 1945–1951. This prospective cohort study will periodically collect information from health questionnaires and compare these findings with findings of CDC's National Health Interview Survey.

Health Studies for Monticello

A health study conducted in San Juan County, Utah, will help determine whether releases from the Monticello Mill Tailings Site are associated with increased morbidity and/or mortality in off-site populations. ATSDR will (1) update the cancer statistics review to include the most current years available and (2) follow up the findings of the renal failure investigation by assessing the incidence of end-stage renal disease in San Juan County and Monticello. A finding of excessive end-stage renal disease may result in a case-series analysis or other health activities as determined by ATSDR and the Monticello community.

ATSDR health education activities assist the community in understanding the effects of exposure to low doses of contaminants. Health education increases knowledge about potential exposures and, therefore, reduces adverse health effects and diminished quality of life resulting from exposure to hazardous substances in the environment.

Community Health Workshops on Epidemiology (e.g., Mound and Portsmouth)

ATSDR and Boston University School of Public Health staff developed a workshop to address questions and concerns raised by community members near DOE sites about how health professionals use health outcome data. The first of these workshops was presented in May 1995 for the community near the DOE Mound Plant in Miamisburg, Ohio. The workshop, attended by 56 people, was titled *An Environmental Health Workshop for the Community*. Boston University professors discussed the types of studies epidemiologists conduct, the kinds of health statistics used in public health, the types of health conditions that might be associated with environmental contaminants, and the means by which health assessors use information gathered from local health professionals and citizens. Participants included representatives of the local environmental health groups, Miamisburg Environmental Safety and Health, and the Fernald Residents for Environmental Safety and Health; workers for the primary contractor (at the time) at the Mound Plant (EG&G Mound Applied Technologies); staff from the Ohio Department of Health, the Ohio Environmental Protection Agency, the Regional Air Pollution Control Agency, the Community Organizing Center, Wright State University, Antioch College, and local hospitals; and other interested persons. Of the attendees, 21 received 6 contact hours of CME credits in nursing or radiologic technology. Participants' evaluations of the workshop were favorable, and Boston University repeated the presentations in the community at the Portsmouth Gaseous Diffusion Plant in Piketon, Ohio, later in 1995.

Sharing Information on Health Effects (e.g., Monticello and Oak Ridge)

ATSDR developed Community Information Sharing Sessions (CISS) on radiation and health in conjunction with EPA's National Air and Radiation Environmental Laboratory (NAREL) to educate and assist the community near the Monticello Mill Tailings Site and Monticello Vicinity Properties Site. These sessions were presented in Monticello and Blanding, Utah, on April 24–27, 1995, for school-aged children and adults in the community and the White Mesa Utes and the Blue Mountain Dineh Indians. Approximately 1,228 people attended. The session was intended to educate the public as well as provide a forum for discussion of radiation exposure and other public health issues. ATSDR and NAREL provided age-appropriate coloring books, comic books, and informational books for the school children during these sessions.

At Oak Ridge, as a follow up to recommendations in the ATSDR health consultation for the Watts Bar Reservoir, ATSDR staff held a community health education meeting in September 1996 to discuss PCBs in the Watts Bar Reservoir. An expert affiliated with the Great Lakes Center, University of Illinois at Chicago, made presentations on the health risks associated with PCBs in fish. Approximately 40 community members attended. Those attending received health education materials developed for the presentation. ATSDR also worked with local residents, organizations, and state officials to develop an instructional brochure on the Watts Bar Reservoir fish advisory.

Physician Education (e.g., Oak Ridge)

PCBs ATSDR participated in a grand rounds presentation at the Methodist Medical Center in Oak Ridge on September 12, 1996. ATSDR mailed invitations to physicians specializing in family practice, obstetrics and gynecology, and pediatrics to discuss health issues related to the Watts Bar Reservoir. Copies of two ATSDR *Case Studies in Environmental Medicine—Polychlorinated Biphenyls* and *Taking an Exposure History* were included with the invitations. The following organizations cooperated and participated with ATSDR in this presentation: the Association of Occupational and Environmental Clinics (AOEC), Tennessee Department of Health, Tennessee Department of Environment and Conservation, Oak Ridge Reservation Local Oversight Committee, and the Methodist Medical Center in Oak Ridge.

Cyanide ATSDR conducted a physician health education session at the Methodist Medical Center in Oak Ridge, in cooperation with the AOEC, NIOSH, and the Tennessee Department of Health. The medical director of the Georgia Poison Control Center, an expert in cyanide posioning, conducted a grand round presentation to assist local physicians and other health care providers in answering patients' questions about and diagnosing chronic and acute cyanide intoxication. Those attending received health education materials developed for the presentation and copies of *ATSDR Case Study in Environmental Medicine—Cyanide Toxicity* and *Taking an Exposure History*. Approximately 50 health professionals and community members attended.

Medical Monitoring

The medical monitoring program will assist in ensuring medical screening for persons who are at significant risk for thyroid and parathyroid conditions. Early diagnosis and treatment will result in saving lives and reducing morbidity.

Medical services will be offered to approximately 14,000 people who were children at the time of the iodine-131 releases from Hanford Nuclear Reservation. These people now reside throughout the United States, with most still living in the Northwest.

Eligible clients and health care providers will be better informed about the health risks and the need for periodic medical evaluations.

The Hanford Medical Monitoring Program will provide ongoing, periodic medical evaluations for thyroid neoplasms and other thyroid and parathyroid conditions. Eligible people are defined by age, time period, and residence during the releases of iodine-131 from Hanford. If specific medical monitoring criteria are met, ATSDR is required by Superfund law to provide services to populations at significantly increased risk after exposures from a facility. Hanford met the criteria and was formally recommended for medical monitoring by ATSDR in February 1997.

Progress At-A-Glance

The following table outlines ATSDR's activities at Department of Energy sites. For each site, the ATSDR activities, activity outcomes, and activity status are listed.

CHARACTERIZE ENVIRONMENTAL CONTAMINATION
ATSDR PROGRESS AT-A-GLANCE AUGUST 1998

Site	Site Activity	Activity Outcome(s) at Time of Completion	Activity Status
Alba Craft Laboratory Oxford, OH	1. Health Consultation - Residential Soils	1. Radiological contamination in the surface soil at the site and neighboring properties does not pose a public health hazard.	1. Completed July 8, 1994
	2. Public Meeting to present consultation conclusions	2. Allayed many community concerns and explained why elevated radon levels are not site related.	2. Completed July 28, 1994
Bonneville Power Authority Bonneville, WA	1. Public Health Assessment	1. Site does not pose an apparent public health hazard.	1. Completed September 28, 1994
Brookhaven National Laboratories Long Island, NY	1. Health Consultation - Ground Water	1. Sampling results of residential wells do not indicate that individuals are being exposed to contaminant levels that would cause adverse health effects.	1. Released for Public Comment October 14, 1997
	2. Health Consultation - Air	2. Draft development	2. Ongoing
	3. Public Health Assessment	3. Draft development	3. Ongoing
	4. Health Education	4. Identify and address community health concerns.	4. Planned
Cape Thompson Radiation Waste/ Point Hope North Slope Borough, AK	1. Health Consultation - Cancer Incidence	1. Cancer rates in North Slope Borough were similar to those in other areas of Alaska. Levels of radioactive materials at the Project Chariot site are not a public health hazard.	1. Completed October 24, 1994
Fernald Environmental Management Plant Fernald, OH	1. Health Consultation - Radon Emissions from K-65 Silos	1. DOE made equipment changes for real-time radon monitors to ensure greater protection of public health.	1. Completed May 1995
	2. Health Consultation - Milk Produced Near the Site	2. Levels of radionuclides in locally produced milk do not pose a public health hazard.	2. Completed June 1995
	3. Health Consultation - Nonpotable Use of Contaminated Groundwater	3. Confirmed that nonpotable use of the groundwater does not pose a health hazard from radionuclides.	3. Completed February 27, 1996
(Ongoing activities continued on next page)	4. Health Consultation - Consumption of Produce	4. Levels of radionuclides in locally grown produce do not pose a public health hazard.	4. Completed January 23, 1996

Completed *shaded* Ongoing *white*

(continued on next page)

CHARACTERIZE ENVIRONMENTAL CONTAMINATION
ATSDR PROGRESS AT-A-GLANCE AUGUST 1998

Site	Site Activity	Activity Outcome(s) at Time of Completion	Activity Status
Fernald Environmental Management Plant Fernald, Ohio *(continued)*	5. Public Health Assessment	5. Draft development	5. Ongoing
	6. Analysis of Fernald Medical Monitoring Data	6. Will determine whether releases from the Fernald site resulted in increased incidence of morbidity or mortality and whether follow-up health activities are needed.	6. Ongoing
	7. Health Education	7. Identify and address community health concerns.	7. Ongoing
Fields Brook Ashtabula, Ohio	1. Public Health Assessment	1. The levels of radioactive contamination off-site would not be expected to cause adverse health-effects.	1. Completed April 9, 1996
Hanford Richland, WA	1. Public Health Assessment - 1100 Area	1. Concluded the 1100 Area does not pose a public health hazard.	1. Completed November 20, 1995
	2. Health Consultation - Hanford Environmental Dose Reconstruction	2. Recommended medical monitoring.	2. Completed December 15, 1993
	3. Health Consultation - 100 IU-1 Expedited Response Action	3. Identified sampling needs.	3. Completed August 16, 1993
	4. Health Consultation - 1100 Area Remedial Action	4. Identified sampling needs.	4. Completed September 1, 1993
	5. Health Consultation - North Slope Area	5. Identified sampling needs.	5. Completed December 15, 1993
	6. Health Consultation - Nitric Acid Explosion	6. Advised emergency room physicians about the latent effects of nitric oxide exposure and follow-up testing was conducted on exposed personnel.	6. Completed May 22, 1997
	7. Public Health Assessment - 100 Area	7. Draft development	7. Ongoing
	8. Public Health Assessment - 200 Area	8. Draft development	8. Ongoing
	9. Public Health Assessment - 300 Area	9. Draft development	9. Ongoing
	10. Fetal and Infant Death Analysis	10. Draft development	10. Ongoing
	11. Medical Monitoring	11. Draft development	11. Planned
	12. Iodine-131 Subregistry	12. Draft development	12. Planned

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Characterize Environmental Contamination
ATSDR Progress At-A-Glance August 1998

Site	Site Activity	Activity Outcome(s) at Time of Completion	Activity Status
Idaho National Engineering and Environmental Laboratories Idaho Falls, ID	1. Health Consultation - Pit 9	1. Notified DOE of adverse outcomes of Pit 9 remediation.	1. Completed September 23, 1993
	2. Health Consultation - Ordnance Area	2. Confirmed that proposed clean-up levels would be protective of public health.	2. Completed September 16, 1993
	3. Health Consultation - Idaho Chemical Processing Plant	3. Draft development	3. Ongoing
	4. Health Consultation - Groundwater	4. Draft development	4. Ongoing
	5. Public Health Assessment	5. Draft development	5. Ongoing
Laboratory for Energy-Related Health Research Davis, CA	1. Site Summary	1. Putah Creek fish were collected and tested for potential mercury and lead contamination.	1. Completed December 12, 1995
	2. Health Consultation - Putah Creek	2. Concluded that fish were contaminated with mercury and lead at levels that pose a public health hazard; additional sampling done to identify the affected fish species and determine whether pesticide contamination is a public health hazard.	2. Completed April 4, 1997
	3. Public Health Assessment	3. Draft development	3. Ongoing
Lawrence-Berkeley National Laboratory Berkeley, CA	1. Health Consultation - Risk Assessment for Tritium	1. Confirmed and concurred with overall risk assessment done by DOE; concluded that tritium releases did not pose a public health hazard.	1. Completed May 14, 1996
Lawrence-Livermore National Laboratory (Main Site and 300 Area) Livermore, CA	1. Health Consultation - Big Trees Park	1. DOE agreed to conduct additional plutonium soil sampling to verify public health safety of Big Trees Park.	1. Released for Public Comment February 9, 1998
	2. Health Consultation - Municipal Water Supplies	2. Identified potential contaminants and additional sampling parameters to ensure safety of municipal water supply.	2. Released for Public Comment February 9, 1998
	3. Health Consultation - Radioactivity in Soil Off-Site	3. Planned	3. Planned
	4. Health Consultation - Tritium in Air	4. Planned	4. Planned
	5. Health Consultation - Off-Site Well Survey	5. Planned	5. Planned
	6. Public Health Assessment	6. Draft development	6. Ongoing

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CHARACTERIZE ENVIRONMENTAL CONTAMINATION
ATSDR PROGRESS AT-A-GLANCE AUGUST 1998

Site	Site Activity	Activity Outcome(s) at Time of Completion	Activity Status
Los Alamos National Laboratory Los Alamos, NM	1. Exposure Investigation - Sampling at San Ildefonso	1. Found elevated concentrations of plutonium-239 and cesium-137 in sediment, and levels of plutonium were elevated in surface water. Although these levels were higher than background, they are not at levels known to adversely affect public health.	1. Completed September 1997
	2. Participation on Steering Committee Review of Los Alamos Cancer Rates	2. Determined that incidence of brain cancer was not elevated. However, incidence of thyroid cancer was elevated.	2. Phase I Completed March 1993
	3. Health Consultation - Acid Canyon	3. Determined that levels of plutonium in Acid Canyon were not a public health hazard for recreational users of Acid Canyon.	3. Completed September 14, 1992
	4. Health Consultation - Tritium in Residential Wells	4. Although tritium was detected in residential wells, water in the wells was safe for drinking.	4. Completed March 10, 1995
	5. Health Consultation - Nitrates in Groundwater	5. Recommendations eliminated potential exposure to nitrates for the most sensitive population, infants less than 4 months of age.	5. Completed April 4, 1995
	6. Health Consultation - Air Monitoring	6. DOE established a Neighbor Environmental Watch Network that included real-time air monitors for gamma radiation in four pueblos near Los Alamos.	6. Completed August 28, 1996
	7. Health Education - Workshop for Pueblo and Rural Communities	7. Approximately 60 community members increased their understanding of health effects associated with chemical and radiation exposure.	7. Completed September 1995
	8. Public Health Assessment	8. Draft development	8. Ongoing

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Characterize Environmental Contamination
ATSDR Progress At-A-Glance August 1998

Site	Site Activity	Activity Outcome(s) at Time of Completion	Activity Status
Maywood Interim Storage Site Bergen County, NJ	1. Public Health Assessment	1. Site is a public health hazard because of chemical and radiological contamination in groundwater. State initiated a cancer incidence study.	1. Completed July 30, 1990
	2. Site Review and Update 1992	2. ATSDR agreed to prepare health consultations and evaluate new data generated in the future.	2. Completed September 4, 1992
	3. Health Consultation - Sears and Commercial Properties	3. Concluded that radon emissions from subsurface soils could expose excavation workers to levels associated with adverse health effects. DOE revised sampling program to include radon-220.	3. Completed November 19, 1993
	4. Health Consultation - Residential and Municipal Properties	4. Identified elevated levels of lead in residential soil. Bergen County agreed to test children for blood lead levels.	4. Completed December 21, 1995
	5. Site Review and Update 1998	5. Draft development	5. Ongoing
Monticello Mill Tailings Site and Monticello Vicinity Properties Site Monticello, UT	1. Public Health Assessment	1. Concluded that in the past the mill posed a public health hazard. Identified higher mortality rates in San Juan for renal failure and breast cancer in females and lung cancer and prostate cancer in males. ATSDR is seeking funds to further investigate these elevated mortality rates.	1. Completed September 30, 1997
Mound Plant Miamisburg, OH	1. Health Consultation - Plutonium in Miami-Erie Canal and Community Park	1. After being notified that levels of plutonium-238 were elevated in the Miami-Erie Canal and Miamisburg Community Park, the city of Miamisburg closed the fishing pond as a public health precaution.	1. Completed September 29, 1993
	2. Public Health Assessment	2. Under current site conditions, the Mound Plant poses no apparent public health hazard.	2. Completed March 30, 1998
	3. Community Education	3. Increased the community's ability to evaluate the usefulness and practicality of collecting and assessing health outcome data.	3. Completed May 19, 1995

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CHARACTERIZE ENVIRONMENTAL CONTAMINATION
ATSDR PROGRESS AT-A-GLANCE AUGUST 1998

Site	Site Activity	Activity Outcome(s) at Time of Completion	Activity Status
Oak Ridge Reservation Oak Ridge, TN	1. Health Consultation-East Fork Poplar Creek 200 ppm	1. Recommended mercury speciation be identified to determine health-based clean-up goal.	1. Completed February 13, 1995
	2. Health Consultation-East Fork Poplar Creek 400 ppm	2. DOE changed remedial goal to 400 ppm mercury on the basis of information provided by ATSDR Science Panel on the bioavailability of mercury.	2. Completed January 26, 1996
	3. Health Consultation-Lower Watts Bar Reservoir	3. Although PCBs in Watts Bar Reservoir fish pose a public health hazard, the reservoir is safe for other recreational uses.	3. Completed February 29, 1996
	4. Exposure Investigation-PCB and Mercury	4. Only 5 (4%) of the 116 people tested had elevated levels of PCBs in their blood, and one person had an elevated level of mercury in blood. Education was provided to community members and health care providers to reduce exposure.	4. Completed September 1997
	5. Public Health Assessment	5. Draft development	5. Ongoing
	6. Health Education	6. Identify and address community health concerns.	6. Ongoing
Paducah Gaseous Diffusion Plant Paducah, KY	1. Site Review and Update	1. Identified potential public health issues: off-site soils and sediment contamination, groundwater contamination, contamination in Big and Little Bayou Creeks, airborne releases, and storage of 40,000 depleted uranium hexafluoride cylinders.	1. Completed December 20, 1996
	2. Public Health Assessment	2. Draft development	2. Ongoing
Pantex Plant Amarillo, TX	1. Site Summary	1. Identified potential public health issues: groundwater contamination and air releases.	1. Completed August 14, 1996
	2. Public Health Assessment	2. Determined site does not pose an apparent public health hazard. Determined that the number of children born in the Pantex area with certain categories of birth defects appears to be higher than what would be expected. Texas Birth Defects Monitoring Division expanded active surveillance of birth defects to the Panhandle Region beginning with 1998 deliveries.	2. Completed September 30, 1998

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Characterize Environmental Contamination
ATSDR Progress At-A-Glance August 1998

Site	Site Activity	Activity Outcome(s) at Time of Completion	Activity Status
Portsmouth Gaseous Diffusion Plant Piketon, OH	1. Public Health Assessment	1. Concluded that site-related contamination and hydrogen fluoride releases do not pose an apparent public health hazard.	1. Completed November 20, 1996
	2. Community Education	2. Increased the community's ability to evaluate the usefulness and practicality of collecting and assessing health outcome data.	2. Completed June 29, 1995
Rocky Flats Golden, CO	1. Health Consultation - Release of OU-3 for Public Use	1. Concluded that heavy metals and radioisotopes in environmental media are present at levels below health hazard and that OU-3 could be safely released for public use.	1. Completed June 24, 1997
	2. Public Health Assessment	2. Planned	2. Planned
	3. Health Education	3. Planned	3. Planned
Savannah River Site Aiken, SC	1. Health Consultation - Metallurgical Laboratory	1. Determined that proposed interim remedial actions were protective of public health.	1. Completed August 12, 1993
	2. Health Consultation - M Area	2. Determined that proposed interim remedial actions were protective of public health.	2. Completed August 12, 1993
	3. Health Consultation - F-, H-, K-, and P-Areas	3. Evaluated concentrations of eight metals in the acid/caustic basins and concluded that metals pose no public health hazard.	3. Completed February 7, 1994
	4. Health Consultation - D-Area Seepage Basin	4. Determined that, if recommended worker precautions were taken during removal actions, the dioxin levels did not pose a health hazard to workers.	4. Completed September 13, 1994
	5. Health Education	5. Identify and address community health concerns.	5. Ongoing
	6. Public Health Assessment	6. Planned	6. Planned
St. Louis Airport St. Louis, MO	1. Public Health Assessment	1. Additional characterization of the local watershed and improvement of dust control measures.	1. Completed January 20, 1994

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CHARACTERIZE ENVIRONMENTAL CONTAMINATION
ATSDR PROGRESS AT-A-GLANCE AUGUST 1998

Site	Site Activity	Activity Outcome(s) at Time of Completion	Activity Status
Weldon Spring Quarry/Plant/ Pits Weldon Spring, MO	1. Health Consultation - Fish Data	1. Concluded that heavy metals in fish at the site do not pose a public health hazard to residents who occasionally eat fish; however, subsistence fishermen may be at increased risk for adverse health effects.	1. Completed April 24, 1989
	2. Health Consultation - Bulk Wastes	2. Concluded that the quarry was a public health hazard and that excavation, transport, and temporary storage of bulk wastes did not present a potential for public exposure to hazardous wastes.	2. Completed January 20, 1994
	3. Health Consultation - Francis Howell High School	3. Concluded that radiation levels at the high school were within normal background ranges.	3. Completed September 15, 1994
	4. Public Health Assessment	4. Concluded that no significant exposures are presently occurring as a result of current activities.	4. Completed June 30, 1997
West Valley Demonstration Project Cattaraugus County, NY	1. Health Consultation - Environmental Impact Statement	1. Two of the proposed alternatives were protective of public health for the Seneca Indian Nation; two alternatives would continue to have a direct, but small, impact on residents of the reservation; one alternative was unacceptable.	1. Completed September 18, 1996
W.R. Grace/ Wayne Interim Storage Site Wayne, NJ	1. Public Health Assessment	1. Concluded that the site was a potential public health hazard. Recommended remediation of railroad spur and properties adjacent to site.	1. Completed July 30, 1990
	2. Health Consultation - Pompton Plains	2. Concluded that radiological contamination in surface soil and in children's sand boxes did not pose a public health hazard.	2. Completed January 26, 1994

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Site-Specific Summaries

The following pages summarize ATSDR's activities at specific Department of Energy sites. Activities include health consultations, public health assessments, exposure investigations, community-based education, health studies and public health interventions.

Alba Craft Laboratory
Oxford, Ohio

Type Site: Petition, Formerly Utilized Site Remedial Action Program (FUSRAP)
Size: 0.25 acres
Facility Status: Inactive
Facility Mission: From October 1952 until February 1957, the mission was to machine natural uranium metal parts for National Lead of Ohio, the former prime contractor for the former Fernald Feed Material Production Center. The laboratory facility is located in a predominantly residential area. The site has been demolished and remediated.

DHAC Site Lead: Carol Connell, BS

Action Dates:

Health Consultation
Radionuclide Exposure to the Public (requested by Senator John Glenn)
06/09/94 - to data validation
07/08/94 - final

Conclusions and Impacts:

ATSDR's health consultation (July 8, 1994) was in response to a request from Senator Glenn to evaluate radiological contaminants from the Alba Craft Laboratory. ATSDR concluded that radiological contamination in the surface soil at the site and neighboring properties does not pose a public health hazard as long as major soil-disturbing activities do not occur. The agency also investigated whether wood ash could be the source of slightly elevated cesium-137 concentrations at one of the residential properties. The higher-than-background level probably resulted from roof runoff when it rained and not from the wood ash; however, ATSDR staff members were able to assure the resident that the concentration did not pose a health hazard.

ATSDR independently interpreted and evaluated the adequacy of exposure indicator testing conducted by DOE-Oak Ridge. Testing included blood and urine analysis and scanning the whole body to determine total internal radioactivity. ATSDR found the testing appropriate and concluded the exposure posed no human health hazard.

ATSDR held a public health forum in Oxford, Ohio, on July 28, 1994, that engaged community members in an open forum that (1) discussed the findings and conclusions of the health consultation, (2) conducted health education activities related to potential exposures to various hazardous and radioactive materials, and (3) enhanced communication between ATSDR and local residents. Following the forum, ATSDR received additional written comments and concerns, which were addressed in individual letters to the community members. Representatives of CDC's National Institute for Occupational Safety and Health also attended the forum to address worker-related issues and potential exposures.

Bonneville Power Authority
Bonneville, Washington

Type Site: NPL (deleted from NPL 9/23/96)
Size: 235 acres
Facility Status: Active
Facility Mission: The mission is and has been the distribution of hydroelectric power generated by the Columbia River to regions throughout the Pacific Northwest and parts of Canada. Laboratory activities involve the use of heavy metals in the testing of capacitors, transformers, and other transmission equipment. Maintenance activities have involved the use of transformer oils containing polychlorinated biphenyls (PCBs) and organic and inorganic compounds associated with the storage of treated wooden transmission poles, paints, solvents, and waste oils.

DHAC Site Lead: Andy Dudley, BS

Action Dates:

Public Health Assessments

10/06/93 - initial release for data validation
04/22/94 - public comment release
09/28/94 - final

Conclusions and Impacts:

The final public health assessment was released on September 28, 1994. ATSDR classified the site as no apparent public health hazard. ATSDR's conclusion of the public health assessment supported DOE's petition to EPA for deletion of the site from the NPL. The site was removed from the NPL on September 23, 1996.

As part of the public health assessment process, ATSDR identified the use of private wells, located in the vicinity of the Bonneville Power Authority (BPA), that had not been previously identified by EPA or DOE. ATSDR used the Geographical Information System (GIS) to identify the location of private wells and to map the migration of the contaminated groundwater plume. This enabled ATSDR to provide independent confirmation that private wells would not be affected by contamination from BPA. ATSDR notified the community of the findings through individual letters and telephone calls. This alleviated fear and anxiety within the community about groundwater contamination.

Brookhaven National Laboratories
Long Island, New York

Type Site: NPL
Size: 5,265 acres
Facility Status: Active
Facility Mission: The mission is and has been to carry out basic and applied research in the following fields: high-energy nuclear and solid state physics; fundamental material and structure properties and the interactions of matter; nuclear medicine and biomedical and environmental sciences; and selected energy technologies.

DHAC Site Lead: Andy Dudley, BS

Action Dates:

Public Health Assessments
10/01/96 - initiated

Health Consultations
Groundwater Contamination (requested by the public and DOE)
11/22/96 - to classification review
11/22/96 - initial release for data validation
05/01/97 - revision and second data validation
09/29/97 - public comment release
10/14/97 - addendum to public comment release

Technical Assistance
03/12/96 - Responded to community member's concerns about specific health effects (e.g., dental problems) associated with contaminated groundwater (letter).
03/13/96 - Responded to community member's concerns about general health effects associated with contaminated groundwater (letter).
09/04/96 - Prepared a fact sheet on ATSDR activities at the site.

Conclusions and Impacts:

As part of the public health assessment process, ATSDR worked with DOE and local community members and organizations (e.g., home owners' associations from the Yaphank, Manorsville, Longwood, Brookhaven, and Middle Island communities; and two activist

groups, Citizens Campaign for the Environment, and Environmental Advocates of Long Island) to determine priorities. Groundwater contamination and air releases from the site's four reactors are the primary health concerns and are being addressed through health consultations.

On October 14, 1997, ATSDR submitted the second health consultation on contaminated groundwater for public comment. Although this draft includes a review of groundwater data generated since the consultation was first drafted, the conclusions and recommendations of the consultation did not change. *Sampling results of residential wells do not indicate that persons are currently being exposed to contaminant levels that would cause adverse health effects*. The consultation was distributed to the community groups and members that ATSDR has been networking with and to individuals on DOE's community mailing list. In addition, ATSDR held public meetings to present the information in the groundwater health consultation.

DOE requested that ATSDR evaluate the results of the groundwater monitoring to determine whether there is a public health hazard associated with the contamination. Residential well monitoring had been completed by DOE and the Suffolk County Department of Health Services (SCDHS) for approximately 675 residential wells in North Shirley, Shirley, East Yaphank, and Manorsville. Monitoring results indicate that some of the wells have levels of volatile organic compounds (VOCs) and a pesticide above the federal and state drinking water standards. The radionuclides strontium-90 and tritium have also appeared at levels above federal and state drinking water standards in on-site monitoring wells.

As a precautionary measure, DOE has offered to test the water in existing private wells that might be affected and, at the homeowner's option, connect residences to the public water supply. DOE, in conjunction with the SCDHS, has connected approximately 1,200 residences to the public water supply. ATSDR believes that it is safer to obtain water from the public water supply than from private wells, because the public water supply is tested regularly. Furthermore, spills of hazardous materials in the area have been reported, and unreported spills might have occurred. ATSDR recommended that residents accept the offer to be connected to the public water supply because all residential wells have not been sampled, the full extent of the contaminant plumes is uncertain, and there is potential for future contamination.

ATSDR will continue to analyze the results of samples of water from monitoring wells and residential wells to determine whether residents are being exposed to contaminants at levels that could result in adverse health effects.

Health Education:

Working with the New York State Department of Health, ATSDR will educate health care providers in the area. Through a series of outreach programs, health care providers will be (1) informed about the health effects associated with hazardous substances at Brookhaven, (2) trained to diagnose and treat breast cancer, and (3) trained to record an exposure history.

Cape Thompson Radiation Waste/Point Hope
North Slope Borough, Alaska

Type Site: Petitioned
Size: 10 cubic meters of soil
Facility Status: Inactive
Facility Mission: The past mission was testing radioactive transport through the environment. The site has been remediated.

DHAC Site Lead: Paul Charp, PhD

Action Dates:

Health Consultation (requested by the local health department)
- 08/17/94 - to classification review
- 09/28/94 - initial release for data validation
- 10/24/94 - final (no comments or changes requested)

Conclusions and Impacts:

In 1993, the North Slope Borough (NSB) Department of Health and Social Services petitioned ATSDR to evaluate (1) the status and potential health threat from the presence of radioactive material in the Cape Thompson area and (2) the incidence of cancer in the area. ATSDR responded by performing a health consultation to determine whether the public health of local residents has been or will be affected adversely by the radiological contaminants at the Project Chariot Site.

The health department expressed concerns regarding the cancer incidence in the NSB and around the Point Hope area. Cancer is now the leading cause of death among Alaska Native women and the second leading cause of death among Alaska Native men. According to Alaska Native elders, cancer previously was not a common disease in the native populations.

On the basis of the supplied information, ATSDR concluded that the levels of radioactive materials at the Project Chariot Site do not pose a public health hazard. Cancer rates in the NSB were similar to those in other areas of Alaska.

Fernald Environmental Management Plant
(Feed Material Production Center)
Fernald, Ohio

Type Facility NPL
Size: 1,050 acres
Facility Status: Inactive production; Active remediation
Facility Mission: The former mission was uranium metal production. The current mission is environmental compliance and restoration.

DHAC Site Lead: French Bell, PE

Action Dates:

Public Health Assessments
FY 1997 - initiated

Health Consultations

Radon Emissions from K-65 Silos (requested by community members)
10/12/94 - to classification review
10/20/94 - initial release for data validation
02/27/95 - public comment release
05/---/95 - final

Milk Produced By Cows Grazing Near the Site (requested by DOE Site-Specific Advisory Board)
02/10/95 - to classification review
03/01/95 - initial release for data validation
03/10/95 - public comment release
06/---/95 - final

Nonpotable Use of Contaminated Groundwater (requested by community members)
08/17/95 - to classification review
09/27/95 - initial release for data validation
02/27/96 - final

Consumption of Produce Grown Near the Site (requested by community members)
09/22/95 - to classification review
11/07/95 - initial release for data validation
01/23/96 - final

Technical Assistance

02/23/96 - Responded to community member's telephone call about health effects from off-site radon releases (letter).

11/10/97 - Responded to community member's letter to Fernald Health Effects Subcommittee (FHES) about impacts from eating vegetables grown near the site (letter).

03/23/98 - Responded to FHES member's questions about comparison values used on selecting contaminants of concern in off-site media (letter).

Conclusions and Impacts:

K-65 Silo Consultation (Ambient and Indoor Radon Monitoring)

- Because ATSDR found that the existing radon monitors did not function in cold temperatures, DOE changed the equipment to provide real-time radon monitoring and ensure greater protection of the public health.
- ATSDR sent letters to 64 homes surrounding the Fernald site, advising residents that current levels of ambient radon do not pose a public health hazard. The letters focused on health education (1) explaining home owner's radon level, its meaning and health implications; (2) providing residents with information to control and reduce levels of radon in their homes; and (3) explaining that the levels of radon seen in houses are naturally occurring and not linked to activities or emissions from the site.
- As part of the ATSDR child health initiative, ATSDR sampled the ball park and confirmed that uranium did not pose a health hazard when children played.

Milk Consultation

- ATSDR determined that the levels of radionuclides in locally produced milk pose no public health hazard.

Produce Consultation

- ATSDR determined that levels of radionuclides in locally grown produce pose no public health hazard.

Groundwater Consultation

- Right-of-way issues were resolved and the public water system was expanded to residents in the Fernald community after ATSDR notified the Ohio Department of Transportation that residential drinking water wells were contaminated. ATSDR verified that water from cisterns was safe to drink. This was a pathway not previously considered by DOE or EPA.

- ATSDR determined that nonpotable use of the groundwater does not pose a health hazard from radionuclides.

Overall Impact of ATSDR

- ATSDR's four health consultations reduced the community's anxiety and stress with regard to exposures from the Fernald site. Through these health consultations, ATSDR engaged community members in health education activities by making presentations at monthly Fernald Residents for Environmental Safety and Health (FRESH) meetings and at Crosby and Ross Townships' meetings.
- ATSDR initiated more effective coordination of the federal and state agencies involved at Fernald. This coordinated effort reduced duplication of activities and ensured that the community received comprehensive public health action using an optimum skill-mix from each agency.
- ATSDR promoted participation of two local governments and the local health agency in Fernald Health Effects Subcommittee.
- ATSDR's work at Fernald was the prototype for the joint committee to coordinate work at other DOE sites. Committee members represented ATSDR and CDC's National Center for Environmental Health and National Institute for Occupational Safety and Health.
- ATSDR gained the trust of the local residents and actively addressed their concerns.

Health Studies:

In cooperation with the University of Cincinnati, ATSDR is analyzing the Fernald Medical Monitoring Program data to determine whether releases from the Fernald site resulted in increased incidence of morbidity or mortality in off-site populations. In FY 1999, the analyses will be completed and summary report prepared. At that time, ATSDR will determine if additional health follow-up activities are indicated.

Health Education:

Working with the Fernald Health Effects Subcommittee, ATSDR will assess health education needs for the community and health-care professionals. On the basis of this needs assessment, ATSDR will develop a program to regularly provide information and training that will enable health care providers to (1) take an exposure history, (2) consult patients regarding radon exposures, and (3) promote behavioral changes that are protective.

Fields Brook
Ashtabula, Ohio

Type Site: NPL, Petitioned, FUSRAP
Size: 26 acres
Facility Status: Active
Facility Mission: One of the missions in the past was the extrusion of depleted uranium and of slightly enriched uranium ingots into rods or tubes. The current mission does not involve radioactive materials.

DHAC Site Lead: Michael Brooks, CHP

Action Dates:

Public Health Assessments (petitioned by community members)
09/30/92 - initial release for data validation
01/08/96 - public comment release
04/09/96 - final

Conclusions and Impacts:

Although there is evidence of uranium-contaminated soil on, and just outside, the Reactive Metals Incorporated Extrusion Plant at Fields Brook, ATSDR concluded that the plant poses no apparent public health hazard. The available data do not indicate current or past exposure to levels of radioactive contamination off-site that would cause adverse health effects. The available community-specific health outcome data do not indicate that the site had adverse effects on human health. No evidence indicates that Fields Brook or its banks exceed guidelines for release of radioactive effluents.

Hanford 100 (Reactors-Columbia River) Area
Richland, Washington

Type Site: NPL
Size: 26 miles of the Columbia River
Facility Status: Inactive
Facility Mission: The original mission was the production of weapons grade plutonium from nine nuclear reactors. The current mission is environmental restoration, decontamination, and demolition of the former reactors.

DHAC Site Lead: Michael Brooks, CHP

Action Dates:

Public Health Assessments
FY 1997 - initiated

Conclusions and Impacts:

No conclusions at this time.

Hanford 200 (Iodine Release) Area
Richland, Washington

Type Site: NPL
Size: 17 square miles
Facility Status: Inactive - undergoing cleanup
Facility Mission: The past mission was production of plutonium for nuclear weapons. The current mission is remediation.

DHAC Site Lead: Paul Charp, PhD

Action Dates:

Public Health Assessments
06/13/97 - to classification review
07/16/97 - initial release for data validation

Technical Assistance
05/22/97 - Tank explosion (assistance requested by community members)

Conclusions and Impacts:

The public health assessment determined that the 200 Area of the Hanford Site poses a public health hazard from site-related contaminants released to the air, soils, and groundwater. The recommendations include environmental health education for affected tribes, communities, and medical providers; fetal and infant death studies; medical monitoring for thyroid disease; and an iodine-131 exposure subregistry. ATSDR has prepared a separate briefing document that describes the Hanford Medical Monitoring and iodine-131 exposure subregistries. Furthermore, ATSDR recommended that DOE proceed with plans to remediate the area to the appropriate standards and pursue controls to maintain suitability for future industrial use.

On May 22, 1997, ATSDR provided technical assistance to the site and to the Kadlic Hospital Emergency Room on potential health effects associated with exposure to nitric oxide in response to a 400 gallon tank explosion on the second floor of a building near the Plutonium Finishing Plant. On the basis of symptoms (e.g., sore throats and a metallic taste) reported by the 10 men involved in the accident, ATSDR concluded that the nitric oxide exposure was greater than that calculated by DOE. ATSDR advised the hospital staff that the symptoms of exposure to nitric oxide might not be initially apparent, because such

symptoms have a tendency to recur and can include latent potentially fatal pulmonary edema. This concern was heightened after one of the men reported renewed symptoms. ATSDR recommended that DOE conduct follow-up lung function monitoring; DOE agreed to provide follow-up monitoring for 6 months.

Hanford 300 (Waste Treatment) Area
Richland, Washington

Type Site: NPL
Size: 5.7 square miles
Facility Status: Active
Facility Mission: The past mission was fabrication of uranium fuel rods that were then irradiated in the 100-Area reactors to produce plutonium. The current mission is research and development.

DHAC Site Lead: JoAnn Freedman, PhD, DABT

Action Dates:

Public Health Assessments
06/13/97 - to classification review
07/16/97 - initial release for data validation

Conclusions and Impacts:

In its public health assessment, ATSDR determined that the 300 Area of the Hanford Reservation poses no public health hazard to the public from site-related contaminants because the public cannot come into contact with contaminants identified in soil and groundwater.

As part of the public health assessment process, ATSDR reviewed the *Proposed Plan for the 300-FF-1 and 300-FF-5 Operable Units* (DOE/RL-95-88) and the *300 Area Process Trenches Modified Closure/Postclosure Plan* (DOE/RL-93-73 Revision 1) and provided draft comments in a health consultation to DOE-Richland on December 1, 1995. Final comments were provided to DOE-Richland on December 29, 1995, after receiving clarification about DOE's intention to maintain institutional controls. ATSDR found the proposed alternative, P-3, protective of human health, given DOE's commitment to maintain these operable units in an industrial-use scenario through indefinite extension of institutional controls.

DOE's commitment to institutional controls has significant public health relevance because the radiation dose and exposure dose will differ depending on whether future use is industrial or residential. ATSDR believes that the DOE-recommended clean-up level of 350 pCi/g (uranium and its decay products) in soils is not protective of public health without institutional controls limiting future use to industrial uses.

Hanford 1100 Area
Richland, Washington

Type Site: NPL (deleted from NPL 9/30/96)
Size: 1.2 square miles
Facility Status: Active
Facility Mission: The mission is and has been to provide vehicle maintenance and general support for the Hanford facility.

DHAC Site Lead: JoAnn Freedman, PhD, DABT

Action Dates:

Public Health Assessments

02/08/95 - to classification review
03/31/95 - initial release for data validation
07/18/95 - public comment release
11/20/95 - final

Conclusions and Impacts:

The final public health assessment was released on November 20, 1995. ATSDR determined that the site poses no apparent public health hazard. This conclusion supported DOE's subsequent petition to EPA for deletion of the site from the NPL. The site was removed from the NPL on September 30, 1996.

ATSDR further stipulated that, if DOE releases the 1100 Area for non-DOE development, either formal steps (e.g., deed restrictions) should be taken to restrict land use in the contaminated areas of the 1100 Area or that additional information should be provided to ATSDR and evaluated to ensure protection of public health.

Idaho National Engineering and Environmental Laboratory
Idaho Falls, Idaho

Type Site: NPL, Petitioned
Size: 890 square miles
Facility Status: Active
Facility Mission: The past and current mission is to conduct nuclear reactor research and further development of nuclear reactors and related equipment; conduct light water reactor safety testing; provide irradiation services; recover uranium from highly enriched spent fuels; and provide storage, monitoring, and processing of radioactive wastes.

DHAC Site Lead: Michael Brooks, CHP

Action Dates:

Public Health Assessments
FY 1998 - initiated

Health Consultations
Pit 9 (requested by DOE)
09/23/93 - final

Ordnance Area Operable Unit (OU) 10-5 (requested by DOE)
12/16/93 - final

Conclusions and Impacts:

As part of the public health assessment process, ATSDR is working with community members, environmental activists, and local health-care providers (i.e., the Idaho Health Effects Subcommittee) to determine public health priorities for activities. Air releases of nitric oxides and ozone from the Idaho Chemical Processing Plant and groundwater contamination are the primary health concerns. These concerns are being addressed through health consultations.

In 1993, DOE requested that ATSDR provide health consultations for proposed remedial actions at Idaho National Engineering and Environmental Laboratory. In response, ATSDR performed two health consultations.

The Pit 9 Health Consultation found that

(1) there does not appear to be any present or future exposure pathway at a level that would cause adverse health effects because public access is prohibited, and
(2) remediation plans to excavate and remove waste forms have the potential to enhance contaminant migration through groundwater contamination if intact glass containers are broken during excavation.

The Ordnance Area OU 10-5 health consultation determined that the cleanup levels for Royal Demolition Explosives (RDX) and trinitrotoluene (TNT) proposed by the Record of Decision are protective of public health.

Laboratory for Energy-Related Health Research
Davis, California

Type Site: NPL
Size: 15 Acres
Facility Status: Inactive
Facility Mission: The past mission was DOE-sponsored research conducted by the University of California at Davis (1958–1988) on the biodistribution of strontium-90 and radium-226 in beagles. The site is currently under remediation.

DHAC Site Lead: William H. Taylor, PhD, DABT

Action Dates:

Public Health Assessments
FY 1997 - initiated

Site Summary
09/28/95 - to classification review
10/19/95 - initial release
12/28/95 - final

Health Consultations
Fish in Putah Creek
03/24/97 - to classification review
04/04/97 - final

Technical Assistance
04/04/97 - Reviewed *Draft Risk Assessment Protocol for the DOE Areas at the LEHR, UC Davis, California* (requested by DOE)

Conclusions and Impacts:

Contaminated Fish Pathway
Because ATSDR notified the state that fish were contaminated with mercury and lead at levels of health concern, California is considering issuing a fish advisory for consumption of contaminated fish from Putah Creek. A decision will be made after ATSDR releases the results of additional fish sampling later in 1998. ATSDR staff first visited the Laboratory for

Energy-Related Health Research (LEHR) site in July 1995. As a result of that visit and after reviewing documents pertaining to the site, the agency issued a site summary report in December 1995. In that report, ATSDR recommended that the fish in Putah Creek, adjacent to the LEHR site, be sampled to ensure that people who eat fish from the creek are not being exposed to unsafe levels of contamination. EPA Region IX scientists collected a total of 141 fish and crayfish from four locations along Putah Creek during a 2-week period in August and September 1996. They also collected water and sediment samples from the creek at the same four locations. ATSDR arranged for EPA's National Air and Radiation Environmental Laboratory (NAREL) to analyze the samples. ATSDR staff reviewed the fish sampling data and issued a health consultation on April 4, 1997.

ATSDR's primary conclusion was that mercury and lead concentrations in some fish collected from Putah Creek pose a public health hazard. The agency recommended posting a general fish advisory and testing another sample of fish to identify which fish species were concentrating the toxic metals.

In October 1997, EPA Region IX returned to Putah Creek to collect fish for further analyses, including determining levels of pesticides. Stakeholders at the LEHR site plan to discuss posting a fish advisory after issuance of the next health consultation, which will address the second round of test results. ATSDR is waiting for final data results from the EPA NAREL laboratories before completing the health consultation.

Lawrence-Berkeley National Laboratory
Berkeley, California

Type Site: Technical assistance request from DOE
Size: 130 acres
Facility Status: Active
Facility Mission: The mission is and has been energy-related research, including biomedical uses of tritium, particle accelerators, and chemistry.

DHAC Site Lead: Paul Charp, PhD

Action Dates:

Technical Assistance (requested by DOE)
05/14/96 - Reviewed DOE's "Environmental Health Risk Assessment for Tritium Releases at the National Tritium Labeling Facility"

Conclusions and Impacts:

At the request of DOE-Oakland, ATSDR provided independent verification of DOE's risk assessment for tritium releases at the National Tritium Labeling Facility. ATSDR recalculated radiation doses received by residents near the facility using different assumptions, dose conversion factors, and risk coefficients. On the basis of these calculations and a comparison of ATSDR's results to the results presented by the laboratory, ATSDR concurred with the overall findings of the risk assessment. These findings indicated that the tritium releases did not pose a public health hazard to the surrounding area.

The agency also supplied comments to the laboratory to clarify issues, thus eliminating apparently contradictory statements found in the assessment, and ATSDR suggested additional exposure pathways that should be evaluated.

Lawrence-Livermore National Laboratory - Main Area
Livermore, California

Type Site: NPL
Size: 800 acres
Facility Status: Active
Facility Mission: The mission is and has been laboratory-conducted research in defense systems, biomedical and environmental research, energy, magnetic fusion, and laser research.

DHAC Site Lead: Paul Charp, PhD

Action Dates:

Public Health Assessments
FY 1997 - initiated

Health Consultations

Plutonium in Big Trees Park (requested by community members)
10/28/97 - to classification review
11/05/97 - initial release for data validation
02/25/98 - public comment release

Municipal Water Supply Quality (requested by community members)
10/16/97 - to classification review
10/24/97 - initial release for data validation
02/25/98 - public comment release

Technical Assistance
04/13/95 - Reviewed data package for plutonium-239 concentrations in soil at a community park (requested by EPA).
04/08/97 - Provided community members with public health information.

Conclusions and Impacts:

ATSDR has engaged community members by asking them to identify issues and set priorities in the public health assessment process. The ATSDR site team includes representatives from the community, TriValley Citizens Against a Radioactive Environment (CAREs), Rotary Club, Central Valley Water Control Board, City of Livermore, Water

Quality Boards from Livermore and Tracy, California Department of Toxic Substances Control, California Department of Health Services (DHS), DOE, and EPA. ATSDR and DHS provide monthly updates to the site team and hold quarterly meetings. These meetings are held in the evening and are open to the public; public attendance at these meetings has grown to over 100 people. Through the site team meetings, ATSDR has provided health education on basic radiation dose, exposures, and health effects, including the *ATSDR Public Health Statements* on plutonium, uranium, and trichloroethylene (TCE).

As a result of the health consultation for Big Trees Park, DOE is testing an additional 1,000 samples to further determine the disposition of plutonium-contaminated sludge.

Lawrence-Livermore National Laboratory - 300 Area
Livermore, CA

Type Site: NPL
Size: 10.2 square miles
Facility Status: Active
Facility Mission: The mission is and has been to serve as a testing ground for the Lawrence-Livermore National Laboratory Main Area. The facility was established in 1955 for materials testing and "non-nuclear" high-explosive diagnostic work. During 1963–1978, open air weapons detonations using tritium, depleted uranium, and beryllium were simulated.

DHAC Site Lead: Paul Charp, PhD

Action Dates:

Public Health Assessments
FY 1997 - initiated

Conclusions and Impacts:

No conclusions at this time.

Los Alamos National Laboratory
Los Alamos, NM

Type Site: Petitioned
Size: 28,000 acres
Facility Status: Active
Facility Mission: The current mission is nuclear research and development, including magnetic and inertial fusion, nuclear fission, nuclear safeguards and security, laser separation, and basic research in physics, chemistry, and engineering.

DHAC Site Lead: Edward A. Tupin, MS

Action Dates:

Public Health Assessments
FY 1998 - initiated

Health Consultations

Acid Canyon Contamination (requested by community)
09/14/92 - final

Tritium in Residential Groundwater Wells (requested by Indian Health Service)
02/14/95 - final

Nitrates in Groundwater (requested by Indian Health Service)
04/04/95 - final

Air Monitoring for Radionuclides on the San Ildefonso Indian Reservation (requested by community)
09/08/95 - to classification review
09/29/95 - initial release for data validation
06/11/96 - to DOE for second data validation
08/28/96 - final

Technical Assistance
03/10/95 - Responded to Indian Health Service regarding high alpha radiation levels found in pueblo wells.

04/04/95 - Provided recommendations and community education materials to San Ildefonso Pueblo regarding nitrate contamination found in residential wells.
07/11/95 - Provided assistance to Eight Northern Indian Pueblo Council in the formulation of a community health survey.
09/21/95 - Provided health education to pueblo governments and rural communities
09/22/95 regarding the adverse health effects of chemicals and radiation.

Conclusions and Impacts:

NAREL Sampling

After collecting and reviewing environmental surveillance data, ATSDR determined that off-site monitoring data were insufficient to determine exposure to possible air releases of radionuclides. ATSDR, through an interagency agreement with the Environmental Protection Agency's (EPA's) National Air and Radiation Environmental Laboratory (NAREL), collected and analyzed off-site samples to obtain more information. The media that were sampled included soil, sediment, surface water, groundwater, fish, vegetation, and produce.

Sampling results indicated concentrations of plutonium-239 and cesium-137 in sediment that were statistically greater than background levels. In addition, elevated levels of plutonium were found in surface water samples. Even though these levels were higher than background concentrations, they were not at levels known to adversely affect public health. Sampling results from vegetation, produce, groundwater, and fish did not indicate elevated levels of radionuclides.

To determine whether individuals were being exposed to radiation from very short-lived contaminants from air emissions, ATSDR deployed thermoluminescent dosimeters (TLDs) at approximately 30 locations in the San Ildefonso Pueblo and around the laboratory boundary. After 1 year of monitoring, no signs of elevated radiation levels were found.

To determine the levels of gamma radiation to which residents are being externally exposed, ATSDR deployed six gamma radiation monitors during August 1996. These monitors were recommended in ATSDR's health consultation, *Air Monitoring for Radionuclides on the San Ildefonso Indian Reservation* (August 28, 1996).

Acid Canyon Contamination

The Working Group to Address Los Alamos Community Health Concerns requested that ATSDR investigate levels of plutonium in Acid Canyon. ATSDR concluded that levels of plutonium did not pose a public health hazard to persons using the canyon for recreational activities, such as jogging.

Tritium Levels in Residential Wells

The All Indian Pueblo Council (AIPC) Environmental Office notified ATSDR that tritium contamination had been detected in several groundwater wells in and around the Los Alamos National Laboratory (LANL) and requested assistance in determining the accuracy of the sampling and analysis. ATSDR, through its interagency agreement (IAG) with NAREL, reviewed the data from LANL and AIPC on the levels of tritium detected, sample collection and analytical processes and possible health implications. The report, issued February 14, 1995, indicated that the tritium could have originated from one or more of the following sources:

- areas of known contamination on or around the LANL;
- natural sources in rain or soil moisture;
- deposition from worldwide fallout resulting from nuclear weapons detonations;
- natural occurrence not previously recognized because the technology to detect tritium at the low levels seen had not been developed or low-level tritium analysis had not been performed earlier; and
- contamination introduced during sample collection or analysis.

A calculation of the potential effective dose equivalent to an individual who consumed water at the highest tritium concentration reported (2237 pCi/L) gave an estimate of 0.104 millirem per year (mrem/y) which is less than 5% of the EPA drinking water limit of 4 mrem/y total radioactivity. This value came from a monitoring well that is not being used for drinking water. Therefore, the levels of tritium reported do not represent a public health threat. Because the descriptions of the methodology and analysis of quality control samples were not provided, ATSDR could not perform a technical review of the methods or accuracy and precision of the analyses.

Nitrates in Residential Wells

On March 29, 1995, the Indian Health Service notified ATSDR that three residential wells on the San Ildefonso Pueblo had concentrations of nitrates above the maximum contaminant level (MCL) of 10 ppm. On April 6, 1995, ATSDR involved the pueblo and state and local environmental health officials in public health activities designed to (1) limit exposure to infants and prevent associated adverse health effects, (2) educate persons about health effects associated with nitrate exposures, and (3) provide examples of specific preventive health measures. The agency also provided copies of ATSDR's *Nitrate Case Study in Environmental Medicine* and the Michigan Health Department's *Nitrate in Drinking Water Fact Sheet* to the pueblo. These activities helped eliminate potential exposure to nitrates in groundwater for the most sensitive population, infants less than 4 months of age.

Air Monitoring at San Ildefonso Pueblo

The San Ildefonso Pueblo requested that ATSDR determine the emissions of radionuclides to the air from the LANL and the impact on public health. ATSDR concluded that the LANL has not identified all sources of radionuclide emissions to the air and, therefore,

radionuclides of concern and the extent of radiation exposure could not be determined. Of particular concern was the possibility that very short lived radionuclides were not being identified by the air monitoring system in use. The agency recommended the installation of real-time air monitoring stations. As a result, DOE established a Neighbor Environmental Watch Network consisting of real-time monitors for gamma radiation, which would be responsive to releases of short lived radionuclides, in four pueblos near the LANL and in the City of Los Alamos, New Mexico.

Technical Assistance
High Alpha Levels in Pueblo Wells
On March 10, 1995, ATSDR reviewed radiological data of drinking water samples taken from the Tesuque Pueblo. ATSDR concluded that water in the Main Well and Backup Well should be safe for drinking. ATSDR recommended that, because alpha radiation levels exceeded Safe Drinking Water Act (SDWA) standards, use of the Bingo 1, Bingo 2, and Camp Ground wells should be restricted to nonpotable uses and that isotopic analyses of water from these wells should be done to determine the source material for the elevated levels of gross alpha and gross beta activity. The Indian Health Service staff and Tesuque Pueblo officials were educated about the health effects and necessary preventive action associated with radiological contamination in drinking water. These activities should eliminate exposure to the most sensitive population, workers at the Bingo and Camp Ground facilities.

Health Studies:

In conjunction with the New Mexico Department of Health, ATSDR participated on the steering committee review of Los Alamos cancer rates. The committee determined that incidence of brain cancer in Los Alamos county was not elevated. However, incidence of thyroid cancer was elevated. The New Mexico Cancer Registry continues to monitor incidence data.

Health Education Activities:

Through a cooperative agreement, Boston University assisted ATSDR in identifying community health concerns and health outcome data. Boston University established a toll free telephone number for the community and provided health education workshops for the San Ildefonso and Santa Clara Pueblos.

ATSDR sponsored a workshop for pueblo and rural communities in September 1995. Approximately 60 people attended the workshop and were provided environmental health information on chemical and radiation exposure.

ATSDR continues to engage community members by providing advice on the public health impact of new environmental sampling results and addressing community health concerns upon request.

Needs assessments are critical in the design to build capacity within a community to address the environmental concerns of affected community members and provide direct input on decisions concerning the health issues related to site releases.

ATSDR has conducted needs assessments for multiple communities in the Los Alamos area, including the Eight Northern Pueblos and Hispanic communities near the site. In FY 1998, ATSDR will implement the health education activities identified in the needs assessment to inform residents in communities around the laboratory about hazards associated with radiation exposure. In FY 1999, ATSDR will continue community and professional health education. ATSDR health education activities assist the community in understanding the effects of exposure to low doses of contaminants. Health education will increase the community's knowledge about potential exposures and, therefore, reduce adverse health effects and diminished quality of life resulting from exposure to hazardous substances in the environment.

Maywood Interim Storage Site
Bergen County, New Jersey

Type Site: NPL, FUSRAP

Size: 11.7 acres
Properties include Maywood Interim Storage Site (MISS), Stepan Chemical Company, 10 additional commercial properties, and 85 municipal and residential properties (some remediated and some scheduled for remediation).

Facility Status: Active (Stepan Chemical, formerly Maywood Chemical Company, is an active chemical company but does not handle radioactive materials).

Facility Mission: The past mission was extraction of thorium from monazite ore and production of rare earth metals and other chemicals. The current mission is interim storage of low-level mixed waste.

DHAC Site Lead: Carol Connell, BS

Action Dates:

Public Health Assessments
- 12/10/88 - initial release
- 07/30/90 - final
- 09/04/92 - site review and update

Health Consultations

Sears and Adjacent Commercial Properties (requested by EPA)
- 08/04/93 - initial release for data validation
- 11/19/93 - final

Contamination on Residential and Municipal Properties in Maywood, Lodi, and Rochelle Park (requested by EPA)
- 09/25/95 - to classification review
- 11/07/95 - initial release for data validation
- 12/21/95 - final

Technical Assistance

08/28/95 - Health Education for Municipal Workers in Lodi

10/03/97 - Review of *Cancer Incidence in Three Communities Near the Maywood Area Superfund Sites (Bergen County), New Jersey: A Site-Specific Follow-Up Health Study* (09/08/97)

08/16/95 - Provided comments on the Engineering Evaluation/Cost Analysis for the Cleanup of Residential and Municipal Vicinity Properties.

12/14/94; 06/19/95; 06/23/95; 09/12/96

- Provided individual community members with information about potential health effects of contaminated soil in Lodi residential lots (letters).

Conclusions and Impacts:

Sears and Adjacent Commercial Properties

ATSDR reviewed the data on elevated levels of volatile organic compounds (VOCs) and radon emissions from subsurface soils and concluded that future excavation on the Sears and adjacent properties could expose unprotected workers to levels associated with adverse health effects. ATSDR recommended suitable precautions be taken during on-site excavation. Surface soil does not pose a public health hazard to incidentally exposed members of the public.

In addition, DOE revised its sampling program after ATSDR recommended that DOE sample for radon-220 (a daughter product of the contaminant thorium-232) instead of radon-222 (the daughter product of uranium, which was not a contaminant). The revised sampling program identified four areas with elevated radon-220 levels. These areas were remediated during the summer of 1996.

Residential and Municipal Properties

ATSDR concluded that current levels of radiological contaminations in surface soils do not pose a public health hazard. However, ATSDR identified elevated levels of lead (1,000 mg/kg) in the soils of one residential property. ATSDR considered this level to be a potential health hazard for children playing in the yard. At ATSDR's request, the Bergen County Health Department tested the children for blood-lead levels.

Technical Assistance

Health Education for Municipal Workers in Lodi

On August 8, 1995, ATSDR provided public health education to municipal workers in Lodi, New Jersey. Through a cooperative agreement with the Boston University School of Public Health, ATSDR explained that, although radiological contamination in surface soil did not pose a health hazard, subsurface soil could be a health hazard and that DOE should be notified before digging or excavating. ATSDR also provided workers with maps of the city and individual properties at which subsurface soil contamination was found.

Review of *Cancer Incidence in Three Communities Near the Maywood Area Superfund Sites (Bergen County), New Jersey: A Site-Specific Follow-Up Health Study*

During the public comment period, ATSDR provided comments and concerns on the draft report to the New Jersey Department of Health and Human Services (NJDHHS). The study reported that brain/central nervous system (CNS) cancer incidence in females increased two-fold; however, because the incidence of brain/CNS cancer cases was so small, this increase may not be significant. NJDHHS plans to continue surveillance of brain/CNS cancer in the study area. The study also reported that, with the exception of brain and CNS cancers in females, incidence rates for all cancers and specific types of cancer were not significantly different than expected in comparison with average state incidence rates.

In a letter dated September 22, 1997, Congressman Steven R. Rothman, Senator Robert G. Torricelli, and Senator Frank R. Lautenberg requested an ATSDR consultation for Maywood, Lodi, and Rochelle Park that addresses demographic population confounders in the study to clarify the epidemiologic significance of the conclusions. They also requested a review of the range of contaminant concentrations that have been released from all sources in the geographic region of concern to identify those materials most likely associated with brain and CNS cancers. ATSDR plans to prepare a site review and update during FY 1998.

Residential Lots

ATSDR responded to community members' requests to evaluate the health risks associated with dose exposure for children who might have been exposed while playing in their yards, sandboxes, and swing sets before DOE's remediation of radiological contamination. ATSDR assured the residents that the radioactive material concentrations did not pose a health hazard.

Review of Engineering Evaluation/Cost Analysis

ATSDR reviewed and commented on the DOE proposed *Engineering Evaluation/Cost Analysis (EE/CA) for the Cleanup of Residential and Municipal Vicinity Properties at the Maywood Site*. ATSDR recommended that the remediation level of 100 pCi/g for uranium on residential soils should be lowered to protect public health. ATSDR further recommended that confirmatory samples be taken after remediation to demonstrate that the properties have been properly remediated.

Monticello Mill Tailings Site
and Monticello Vicinity Properties Site
Monticello, Utah

Type Site: NPL
Size: 78 acres
Facility Status: Inactive
Facility Mission: Initially served as an ore-buying station. Ore production increased sufficiently to justify mill construction in 1941. Produced vanadium (1942–1943), uranium-vanadium sludge (1943–1946), and uranium (1949–1960). The current mission is site remediation.

DHAC Site Lead: Marcie Gallagher, BCE

Action Dates:

Public Health Assessments

10/24/95 - to classification review
12/28/95 - initial release
12/20/96 - public comment release
09/30/97 - final

Health Education

April 1995

Conclusions and Impacts:

Public Health Assessment

ATSDR concluded that (1) the mill previously posed a public health hazard and (2) because site access is now strictly controlled, the mill tailings on site currently do not pose a public health hazard. Industrial hygiene surveys of the mill performed when the mill was operating reported that conditions were “very dusty” and that many workers were exposed to levels of radioactive dusts above allowable concentrations. Hazardous substances included yellow cake (uranium oxides), black cake (vanadium oxides), uranium, vanadium, and chlorine gas.

ATSDR identified higher mortality rates in San Juan County for renal failure and breast cancer in females and lung cancer and prostate cancer in males.

In the 1993 DOE Monticello Annual Report, ATSDR is credited with increasing public awareness of remedial actions at the site. As a result of ATSDR's work with the community, DOE re-evaluated the Record of Decision and modified it to include a strategy of on-site burial of contaminated soil and debris which was formulated by local community members.

Health Studies:

Based on results from an updated cancer statistics review, an assessment of end-stage renal disease incidence in San Juan County, and a potential case-series analysis of end-stage renal disease, ATSDR staff will collaborate with community representatives to determine the feasibility of and interest in conducting epidemiologic studies of selected cancers or end-stage renal disease. Working with the community, ATSDR staff will design and conduct a study to estimate the association between exposure to radioactive contaminants and subsequent health effects. In addition to cancer and renal disease, early stage kidney disease (i.e., as assessed by the use of biomarkers) may be a possible outcome to evaluation.

A health study conducted at the site will help determine whether releases from the Monticello Mill Tailings Site are associated with increased morbidity and/or mortality in off-site populations. In addition, a study using biomarkers of effect would advance scientific knowledge in the field of preclinical disease research.

Health Education:

In conjunction with EPA's National Air and Radiation Environmental Laboratory (NAREL), ATSDR developed community information sharing sessions on radiation and health to educate and assist the community near the Monticello Mill Tailings Site and the Monticello Vicinity Properties Site. The sessions were conducted in Monticello and Blanding, Utah, April 24–27, 1995, with school-aged children (elementary, middle, and high school) and adults in the , communities, including the Ute Indians and the Blue Mountain Dineh Indians. Approximately 1,228 people attended, and the sessions effectively enabled ATSDR to engage community members in health education activities and provided an open forum to discuss radiation and public health issues. ATSDR and NAREL provided age-appropriate materials (e.g., coloring books, comic books, and informational books) for meeting attendees.

Mound Plant
Miamisburg,Ohio

Type Site: NPL
Size: 306 acres
Facility Status: Active
Facility Mission: The mission previously was research, development, and manufacturing of components for nuclear weapons. The current mission is producing batteries for space craft and recycling tritium

DHAC Site Lead: William H. Taylor, PhD, DABT

Action Dates:

Public Health Assessments

06/18/96 - to classification review
08/09/96 - initial release
12/02/96 - public comment release
03/30/98 - final

Health Consultations

Plutonium in Miami-Erie Canal and Community Park (requested by DOE)

08/04/93 - initial release for data validation
09/29/93 - final

Technical Assistance

07/22/94 - Provided comments on the Operable Unit 4 (OU-4) Removal Action Engineering Evaluation/Cost Analysis (EE/CA) document at DOE's request.
11/22/94 - Provided comments on the Draft Site Treatment Plan for Mixed Wastes at the Mound Facility, Miamisburg, Ohio, Background and Plan Volumes at DOE's request.
01/11/95 - Provided comments on the Operable Unit 1 (OU-1) proposed plan at DOE's request.
06/20/95 - Provided comments on the Operable Unit 9 (OU-9) Regional Soils Investigation Report.
09/08/95 - Provided comments on OU-9 Residential, Municipal, and Industrial Well Investigation Technical Report.
12/07/95 - Provided comments on OU-4 proposed cleanup of canal soils.

Conclusions and Impacts:

Public Health Assessment

ATSDR released the Mound Plant public health assessment for public comment on December 2, 1996. Approximately 200 written comments were received from 12 sources, including individuals, organizations, and agencies. ATSDR released the final version of the public health assessment on March 30, 1998. ATSDR concluded that, under current site conditions, the Mound Plant poses no apparent public health hazard to off-site populations. Although members of the public may be exposed to contamination from the Mound Plant, the levels of contamination are not high enough to cause adverse health effects.

ATSDR identified one pathway whereby past exposures to biological contamination could have resulted in adverse health effects. In 1982 and 1983, releases of wastes from the Mound Plant sanitary sewage treatment facility to the Great Miami River posed a temporary public health hazard to people swimming, boating, or fishing downstream in the river. The releases of undertreated wastes to the river were transient. People who were exposed to river water during the time of these releases could have become ill; however, no water-related disease outbreaks were reported in the area during this period. No problems with the Mound sanitary sewage treatment facility have been reported since 1986.

ATSDR did not identify any other historic releases of contamination from the Mound facility that posed a public health hazard; however, some historic pathways are indeterminate. ATSDR does not have sufficient data to evaluate fully whether polonium-210 or nonradioactive substances released from the Mound facility ever posed a public health hazard. ATSDR is investigating the feasibility of reviewing laboratory notebooks for additional environmental data from the 1950s.

Other historical releases of radioactive materials to the environment from the Mound facility, including plutonium-238 and tritium, did not pose a public health hazard. ATSDR extensively evaluated both plutonium-238 and tritium data and concluded that the data are sufficient to make this determination.

Health Consultation

Plutonium in Miami-Erie Canal and Community Park

After ATSDR notified city public health officials that levels of plutonium-238 were elevated in the Miami-Erie Canal and Miamisburg Community Park, the City of Miamisburg closed the community fishing pond as a public health precaution. ATSDR examined historic environmental data describing plutonium that had spilled off site and was still present in soils. ATSDR concluded the data indicated plutonium-238 did not pose a public health hazard. However, data were insufficient to determine if the fish in the South Pond were safe to eat. ATSDR recommended (1) that soil, surface water, and air be analyzed further for numerous analytes and (2) that fishing be restricted in the South Pond until data were

available to verify the safety of eating the fish. As a result, the City of Miamisburg prohibited fishing in the South Pond.

Technical Assistance

OU-4 Removal Action EE/CA document

ATSDR provided comments on the OU-4 Removal Action EE/CA document and raised numerous technical questions, that were addressed in subsequent document drafts.

Draft Site Treatment Plan for Mixed Wastes

ATSDR provided comments on the Draft Site Treatment Plan for Mixed Wastes at the Mound Facility and raised technical questions that were addressed in subsequent document drafts.

OU-1 proposed plan

ATSDR provided comments on the OU-1 proposed plan and concurred with DOE's preferred remediation alternative.

OU-9 Regional Soils Investigation Report

ATSDR provided comments on the OU-9 Regional Soils Investigation Report, which described results of an extensive soils survey. ATSDR concluded the contaminants detected do not pose a public health hazard. The information in this report was used in ATSDR's public health assessment.

OU-9 Residential, Municipal, and Industrial Well Investigation Technical Report

ATSDR provided comments on the OU-9 Residential, Municipal, and Industrial Well Investigation Technical Report, which described results of an extensive well and cistern survey. ATSDR identified contaminants at levels of concern and conducted follow-up inquiries as to the location and use of contaminated wells and cisterns. Only one well that was still in use had hazardous lead levels. ATSDR engaged the assistance of the local county health department to conduct follow-up interviews with and recommendations for the residents.

OU-4 proposed clean-up levels of canal soils

ATSDR provided comments on the OU-4 proposed clean-up levels of canal soils. ATSDR supported proposed clean-up levels and clarified for the public the health conclusions regarding plutonium contamination in the canal soils.

National Air and Radiation Environmental Laboratory (NAREL) Sampling

With the assistance of NAREL, ATSDR developed and conducted an extensive environmental survey of the area surrounding the site. NAREL analyzed numerous samples in six environmental media for an extensive battery of radionuclides. These data contributed substantially to the public health assessment for the site.

Community Education
ATSDR developed a workshop series through the Boston University School of Public Health to educate and assist communities near DOE sites in evaluating the usefulness and practicality of collecting and assessing health outcome data. The first workshop was presented in Miamisburg on May 19, 1995, for the community surrounding the Mound Plant. Approximately 65 community members attended this workshop. The workshops are intended to help address the ongoing requests from the public for greater involvement in public health decision making. Continuing medical education units were provided for nurses and radiological technicians. The workshops educate the public as well as provide a forum for discussion of public health issues.

Resources Provided
ATSDR provided copies of numerous documents to individuals in the Miamisburg community and to the Mound Plant CERCLA Public Reading Room. Documents included ATSDR's *Hazardous Substances and Public Health* (the agency's newsletter), Public Health Statements, Toxicological Profiles, Case Studies, and CDC reports on lead poisoning in children. ATSDR established a toll-free telephone number to respond to public inquiries, including those from Miamisburg residents. At ATSDR's request, staff from the Boston University School of Public Health met with community members to provide advice regarding the design and implementation of a neighborhood health survey in Miamisburg.

Public Meetings and Communications
ATSDR conducted numerous meetings in Miamisburg with members of the community, the Mayor and City Manager, and the Miamisburg City Council. ATSDR staff also met privately with members of two community organizations, Miamisburg Environmental Safety and Health (MESH) and Neighbors in Need. ATSDR conducted public availability sessions in the fall of 1993 to invite the public to relay to ATSDR staff their health concerns about the site. Health concerns collected were an important focus of the public health assessment; some concerns were provided to Mound officials to address. ATSDR, along with staff from Boston University and CDC's National Institute for Occupational Safety and Health, met with Mound workers to discuss their health concerns. ATSDR's involvement at the site paralleled DOE's increased involvement of the community in site decision making. ATSDR held public meetings to communicate its activities in the community, including the release of documents and their conclusions, environmental sampling activities, and ATSDR's position on conducting health studies in Miamisburg.

Letters and Newspaper Columns
ATSDR sent information to individuals and organizations about its activities, environmental sampling plans and results, and positions on public health issues in the community. These correspondences included the following:

- Several articles to the site newsletter, *Superfund Update*, detailing ATSDR activities.
- Letters to the Miamisburg City Manager, Miamisburg School District, and residents detailing proposed environmental sampling activities, data collected thus far, and evaluation of the data.
- Letter to the Miamisburg City Manager and MESH clarifying ATSDR's position on the contamination in the canals and Miamisburg Community Park.
- Letter to MESH describing the comparison values used for the hazard evaluation.
- Letter to site officials clarifying risks from contamination in the Miami-Erie Canal.
- Letter to the *Dayton Daily Voice* responding to public comments that a health study should be done in Miamisburg.

ATSDR's efforts to inform and educate the community resulted in greater dialogue among interested stakeholders at the site.

Oak Ridge Reservation
Oak Ridge, Tennessee

Type Site: NPL, Petitioned
Size: 37,000 acres
Facility Status: Active
Facility Mission: To expand both basic and applied knowledge in all areas related to energy, to produce nuclear weapons components, and to provide support to weapons design laboratories.

DHAC Site Lead: Jack Hanley, MPH

Action Dates:

Public Health Assessments
FY 1998 - initiated

Health Consultations (requested by community members and the City of Oak Ridge)
Proposed Mercury Clean-Up Level for East Fork Poplar Creek
12/12/94 - to classification review (200 ppm)
12/21/94 - initial release for data validation (200 ppm)
02/13/95 - public comment release (200 ppm)
02/13/95 - final (200 ppm)

06/07/95 - initial release for data validation (400 ppm)
06/---/95 - public comment release (400 ppm)
01/26/96 - final (400 ppm)

Lower Watts Barr Reservoir Operable Unit
09/12/95 - to classification review
09/22/95 - initial release for data validation
02/29/96 - public comment release

Technical Assistance
08/29/95 - Expert panel to evaluate methods for determining bioavailability of mercury in soil.
01/--/96 - Began investigation of reported K-25 plant worker cyanide exposure.
07/--/96 - Conclusion of K-25 plant worker cyanide exposure investigation.
08/13/96 - Physician and health professional education meeting on cyanide.

09/11/96 - Community education meeting on polychlorinated biphenyls (PCBs) in fish.
09/12/96 - Physician and health professional education meeting on PCBs in fish.
05/05/97 - Reviewed draft of *Decision-Making Related to the Clean-Up of Mercury Contamination at Lower East Fork Poplar Creek: Workshop Summary Report*.

Conclusions and Impacts:

ATSDR is focusing on ***current*** public health issues at Oak Ridge Reservation (ORR) and is assisting the state of Tennessee in its study of ***past*** public health issues. After a site visit in March 1992 and consultations with the Tennessee Department of Health, Tennessee Department of Environment and Conservation, EPA, Oak Ridge Health Agreement Steering Panel, and DOE, ATSDR focused its activities on public health issues not covered by a study the state is conducting of past exposures related to ORR. ATSDR has provided technical assistance to the Tennessee Department of Health on issues such as toxicology, epidemiology, public health education, physician education, and community involvement. To ensure close interaction and communication between the agencies and prevent duplication of effort, ATSDR staff members will continue to attend the panel's meetings and meet with the state staff members on a regular basis.

ATSDR has been addressing current public health issues related to two areas affected by Oak Ridge Reservation operations—the East Fork Poplar Creek area and the Watts Bar Reservoir. In addition, ATSDR has been involved in other public health activities, such as assisting Oak Ridge workers who were concerned about adverse health effects associated with exposures to hazardous substances at work.

East Fork Poplar Creek

East Fork Poplar Creek flows through the Oak Ridge Reservation and the city of Oak Ridge. ATSDR has conducted two health consultations on public health issues of concern to the community bordering the creek and has convened an expert panel to examine issues relating to the bioavailability of mercury. In addition, ATSDR staff members have participated in DOE's East Fork Poplar Creek Citizens Working Group meetings, attended DOE's Record of Decision workshop for East Fork Poplar Creek in 1995, and reviewed and provided comments on DOE's draft Record of Decision. Following are summaries of ATSDR's primary activities involving East Fork Poplar Creek.

Health Consultation on Proposed Mercury Clean-up Levels

In response to a request from community members and the city of Oak Ridge, ATSDR evaluated the public health impact of DOE's clean-up levels of 180 mg/kg and 400 mg/kg mercury in soil at the East Fork Poplar Creek flood plain. ATSDR concluded that these clean-up levels are protective of public health and do not pose a public health hazard to children or adults.

ATSDR Science Panel Meeting on the Bioavailability of Mercury in Soil
The science panel identified methods and strategies that enable health assessors to develop data-supported, site-specific estimates of the bioavailability of inorganic mercury, arsenic and lead from soils. The panel comprised private consultants and academicians internationally known for their metal bioavailability research and experts from ATSDR, CDC, the National Institutes of Health, and EPA. ATSDR used information obtained from the panel meeting to evaluate the East Fork Poplar Creek clean-up level. The findings of the science panel also were used to characterize and evaluate other waste sites with mercury in soil.

Watts Bar Reservoir
ATSDR staff members conducted a community based intervention which included health consultation, community and physician educational programs, and an exposure investigation in response to health concerns of residents in the area of the Watts Bar Reservoir. Following are summaries of these activities.

Health Consultation on the Lower Watts Bar Reservoir
In this consultation, ATSDR found that PCBs in fish at the Lower Watts Bar Reservoir pose a potential public health hazard. Frequent and long-term ingestion of fish from the reservoir poses a moderately increased risk for cancer and increases the possibility of developmental effects in infants whose mothers eat fish regularly during gestation and while nursing. Turtles in the reservoir might also contain levels of PCBs that pose a potential public health hazard.

The consultation found that levels of contaminants in the reservoir surface water and sediment do not pose a public health hazard. The reservoir is safe for swimming, skiing, boating, and other recreational purposes. Drinking water from the municipal water system is safe to drink.

The consultation’s third major finding was that DOE's selected remedial actions are protective of public health. These actions include maintaining the fish consumption advisories; continuing environmental monitoring; implementing institutional controls to prevent disturbance, resuspension, removal, or disposal of contaminated sediment; and providing community and health professional education about the PCB contamination.

Community and Physician Education
ATSDR developed community and physician educational programs on PCBs in the Watts Bar Reservoir to follow up on recommendations contained in the health consultation. Daniel Hryhorczuk, MD, MPH, ABMT, of the Great Lakes Center, University of Illinois at Chicago, made presentations on the health risk associated with PCBs in fish. Approximately 40 community members attended the community health education meeting in Spring City on September 11, 1996. Those attending received health educational materials developed for the presentation. A physician and health professional educational meeting for health-care

providers in the vicinity of the lower Watts Bar Reservoir was held at the Methodist Medical Center in Oak Ridge on September 12, 1996. Physicians specializing in family practice, obstetrics and gynecology, and pediatrics were mailed invitations to the grand round presentation and copies of *ATSDR Case Study in Environmental Medicine—Polychlorinated Biphenyls* and *Taking an Exposure History*. ATSDR has also worked with local residents, organizations, and state officials to develop instructional brochures about the Watts Bar Reservoir fish advisory.

Watts Bar Reservoir Exposure Investigation

ATSDR staff members are conducting an exposure investigation to determine if people eating Watts Bar Reservoir fish or turtles are exposed to elevated levels of PCBs and mercury. Previous studies by state and federal agencies determined that the only exposure of public health concern is ingestion of fish or turtles contaminated with PCBs. However, these previous studies did not have actual evidence of elevated exposures to PCBs among persons who often eat Watts Bar Reservoir fish. The estimated excess lifetime cancer risk from ingesting PCB-contaminated fish from the Clinch River and Watts Bar Reservoir is about 1 in 1,000. Mercury is being evaluated in the exposure investigation because Oak Ridge area residents are concerned about large past releases of mercury from Oak Ridge Reservation.

In September 1997, ATSDR screened several hundred families and obtained blood samples from 116 participants, including 14 from the Scarboro community, to be analyzed for exposure indicators. Those screened were also given a health educational brochure to help explain ways to reduce consumers' health risks. These participants were interviewed, and blood samples were analyzed for serum PCB and blood mercury. In November 1997, ATSDR sent all participants written notification and interpretation of their individual results. In December 1997, an ATSDR physician conducted follow-up interviews with participants identified as having elevated values. During March 16–19, 1998, ATSDR held public meetings in Oak Ridge, Kingston, and Spring City to discuss the results of the exposure investigation.

Findings:

1. Participants' serum PCB levels and blood mercury levels were similar to levels found in the general population.

2. Only 5 (4%) of the 116 people tested had PCB levels that were greater than 20 micrograms per liter (µg/L) or 20 parts per billion (ppb), which is considered an elevated level of total PCBs. Four of the five participants whose levels exceeded 20 µg/L had levels between 20 and 30 µg/L. This means that most of the participants had PCB blood levels that are not different from those expected in the general population. Only one participant had a serum PCB level of 103.8 µg/L, which is significantly higher than the serum PCB level expected in the general population. Follow-up counseling was provided to participants who had elevated levels of PCBs in their blood. The follow-up

was provided to learn more about ways that the PCBs might have gotten into participants' bodies and to suggest ways to reduce the amount of PCBs getting into their bodies in the future.

3. Only one participant in the exposure investigation had a total blood mercury level greater than 10 µg/L, which is considered elevated. The remaining participants had mercury blood levels that ranged up to 10 µg/L, as might be expected in the general population.

Technical Assistance

Reported K-25 Cyanide Exposure

During the second and third quarters of FY 1996, ATSDR provided technical assistance in response to requests from a Lockheed Martin Energy Systems employee regarding possible cyanide exposure at the Oak Ridge Reservation's K-25 facility. To address the employee's concerns about potential workplace exposures, ATSDR referred the employee to CDC's National Institute for Occupational Safety and Health (NIOSH) for a Health Hazard Evaluation of the workplace. ATSDR provided NIOSH with background and historical information on the public health activities at the Oak Ridge Reservation, names of experts for more information, a copy of the ATSDR case study for cyanide, a copy of the Toxicological Profile for Cyanide, and a list of preliminary reference values for urine thiocyanate.

NIOSH reviewed this information, conducted a medical and environmental assessment of the workplace, and concluded that K-25 employees had not been occupationally exposed to cyanide compounds.

To address the employee's personal health concerns, ATSDR provided the employee and the employee's personal physician with copies of the *ATSDR Case Study in Environmental Medicine—Cyanide Toxicity*, the final health hazard evaluation from NIOSH, and a copy of the Public Health Statement for Cyanide and put in place a system for the physician to use the Association of Occupational and Environmental Clinics (AOEC) for referrals.

Health Professional Education on Cyanide

ATSDR conducted a physician health education session at the Methodist Medical Center in Oak Ridge, in cooperation with the AOEC, NIOSH, and the Tennessee Department of Health. Lorne Garrettson, MD, ABMT, Medical Director of the Georgia Poison Control Center, conducted a grand round to assist local physicians and other health-care providers in diagnosing and answering patients' questions about chronic and acute cyanide intoxication. Those attending received health education materials developed for the presentation and copies of *ATSDR Case Study in Environmental Medicine—Cyanide Toxicity* and *Taking an Exposure History*. Approximately 50 health-care professionals and community members attended.

Local Physician's Health Concerns

An Oak Ridge physician believed that approximately 60 of his patients had been exposed occupationally and environmentally to multiple heavy metals, which he believed resulted in increased cancer, immunosuppression, and autoimmune disease. In 1993, ATSDR and CDC facilitated laboratory support from CDC's National Center for Environmental Health for clinical evaluations of selected patients who were referred to the Emory Clinic.

In addition, in August 1992, ATSDR reviewed the physician's medical records and the Tennessee Department of Health's health statistics review of the physician's concerns. ATSDR scientists concluded that the physician's concerns could not be verified with the available information and that a well-designed study would be required to evaluate the concerns.

ATSDR will continue to provide health-care providers education about adverse effects associated with exposure to hazardous substances.

Health Studies:

ATSDR will review the state's dose reconstruction (PCB, mercury, cesium, iodine, and uranium) to assess exposure and potential populations at risk and determine the appropriateness and feasibility of conducting health studies.

Paducah Gaseous Diffusion Plant
Paducah, Kentucky

Type Site: NPL
Size: 3,423 acres
Facility Status: Active
Facility Mission: The mission is and has been to enrich uranium up to approximately 2.5% U-235 for further enrichment at another site. The enriched uranium is eventually used as fuel for nuclear reactors. The DOE mission is to manage the legacy of wastes and restore the environment. The operating plant has been privatized, is currently operated by the U.S. Enrichment Corporation, and is regulated by the U.S. Nuclear Regulatory Commission.

DHAC Site Lead: Carol Connell, BS

Action Dates:

Public Health Assessments
FY 1997 - initiated

Site Summary
08/28/96 - to classification review
09/17/96 - initial release for data validation
12/20/96 - final

Conclusions and Impacts:

No conclusions at this time.

ATSDR's Site Summary (December 17, 1996) identified the potential public health issues that ATSDR will be evaluating as part of the public health assessment process. These issues include technetium-99 (Tc-99) and oxides of uranium contamination found in off-site soils and sediment; trichloroethylene (TCE), toluene, benzene, uranium-234, uranium-238, and Tc-99 contamination in the groundwater; contamination in Big and Little Bayou Creeks; airborne releases and storage and disposal of 40,000 depleted uranium hexafluoride cylinders. After evaluating potential exposures, ATSDR will assess the feasibility of a health study to investigate exposures to TCE and other hazardous substances.

Pantex Plant
Amarillo, Texas

Type Site: NPL, Petitioned
Size: 10,300 acres
Facility Status: Active
Facility Mission: The mission is and has been assembly and maintenance of nuclear weapons including weapons stockpile maintenance, safety inspections, weapons components disposal, and high explosives machining and development.

DHAC Site Lead: Richard Collins, MS, RS

Action Dates:

Public Health Assessments

04/16/97 - to classification review
06/13/97 - initial release for data validation
12/11/97 - public comment release
9/30/98 - final

Site Summary

03/11/96 - to classification review
03/18/96 - initial release for data validation
08/14/96 - final

Technical Assistance

01/--/97 - off-site groundwater data evaluation consultation

Conclusions and Impacts:

The public health assessment was released for public comment on December 11, 1997. ATSDR concluded the site poses no apparent public health hazard. This conclusion supported DOE's subsequent petition to EPA for deletion of the site from the NPL.

In evaluating citizens' public health concerns, ATSDR obtained the assistance of the Texas Department of Health (TDH), Bureau of Epidemiology. A synopsis of the evaluation of citizens' concerns follows. Community members questioned excessive cancer rates in Carson, Potter, Randall, and Armstrong counties; excessive birth defects; and other adverse health effects that they believed to be associated with environmental releases from the site.

Although the number of cases and/or deaths reported for some types of cancers in those counties may be higher than expected in comparison with numbers for other populations, an ATSDR review of available environmental data indicated that it is unlikely that area residents come into contact with significant enough amounts of chemicals or radioactive substances from the plant to cause adverse health effects. Thus, the Pantex Plant is probably not the cause of the higher than expected incidence of cancer in this area.

The concern that the occurrence of birth defects was elevated in the counties surrounding Pantex required evaluation of information obtained from birth certificates, fetal death certificates, and infant death certificates. The number of children born in this area with certain categories of birth defects appears to be higher than expected based on similar birth defect information obtained for the entire state. To determine an underlying cause for the apparent increase, TDH evaluated parental occupation and place of employment and distribution of birth defects by zip code. No parental occupations or workplaces were notable. Few parents of children born with birth defects worked at the Pantex facility. Additionally, although one zip code near the plant (79107, which extends from the western edge of the Pantex Plant along the Potter County/Carson County border toward Amarillo) showed significant elevations for several birth defect categories, there was no consistent pattern among zip codes showing that closer proximity to Pantex increased the risk for birth defects.

An investigation of the incidence of low birth weight in newborns concluded that, although the incidence was increased in Armstrong County, no data indicated that proximity to the Pantex Plant increased the risk for low birth weight. An evaluation of the number of people with muscular dystrophy, multiple sclerosis, amyotrophic lateral sclerosis, and lupus erythematosus in the area indicated a higher than expected number of deaths from all but lupus erythematosus. There was no consistent pattern of deaths from these diseases in the four-county area. In some instances, the number of deaths attributed to these diseases was elevated for males and not females; in other instances, the reverse was true. The causes of many of these diseases are not clearly understood. Detailed answers to questions about patterns of disease occurrence appear in the Public Health Implications and Community Health Concerns Evaluation sections of the public health assessment.

Portsmouth Gaseous Diffusion Plant
Piketon, Ohio

Type Site: Petitioned
Size: 6 square miles
Facility Status: Active
Facility Mission: The mission is and has been to enrich uranium from U-235 to U-238 for eventual use as fuel for nuclear reactors. The DOE current mission is to manage the legacy of wastes and restore the environment.

DHAC Site Lead: Michael Brooks, CHP

Action Dates:

Public Health Assessments

02/10/95 - to classification review
03/31/95 - initial release for data validation
12/19/95 - public comment release
11/20/96 - final

Conclusions and Impacts:

The public health assessment concluded that site-related contamination and hydrogen fluoride releases pose no apparent public health hazard.

There appears to be no threat to public health from any site activity or release. No contaminants were accessible on or off site at any hazardous level. Radiation measurements on and off site did not exceed normal variations in background for the region.

Residents have questioned excessive cancer rates in Scioto County, excessive birth defects, and other adverse health effects that they believed were associated with environmental releases from the site. Available information about health outcomes does not suggest any adverse health impact resulting from operations at the facility.

The public health assessment made DOE aware that the plant was still releasing hydrogen fluoride and that community health concerns were consistent with hydrogen fluoride exposure. DOE has agreed to install real-time monitors for hydrogen fluoride on the purge vents as recommended by ATSDR.

As part of the public health assessment process, ATSDR identified a family with Neurofibromatosis - Type 1 (NF1) (not associated with releases from Portsmouth) and notified the state health department. NF1 is an inherited dominant genetic disease and is has been identified as the most common cause of childhood cancers. NF1 also can cause café-au-lait macules, axillary freckling, neurofibromas, Lisch nodules, and learning disabilities. Although residents around the site alleged numerous health effects from the site, ATSDR did not find a plausible link with levels of exposure from the site. Although there is no evidence of releases at levels that could adversely affect public health, the agency recommended site-specific environmental health education to address community concerns about individual health outcomes that were consistent with exposure to substances present at the site.

ATSDR developed a workshop series through the Boston University School of Public Health to educate and assist communities near DOE sites in evaluating the usefulness and practicality of collecting and assessing health outcome data. On May 19, 1995, the first workshop was presented in Miamisburg, Ohio, for the community surrounding the Mound Plant. On June 29, 1995, the second workshop was presented in Piketon, Ohio. Approximately 30 members of the community attended the Portsmouth workshop. The workshops increased public involvement in the public health decision-making process. The workshops educated the public and provided an open forum for discussion of public health issues.

Rocky Flats
Golden, Colorado

Type Site: NPL
Size: 6,550 acres
Facility Status: Production Status: Inactive
Facility Mission: The past mission (1952–1989) was nuclear weapons production/plutonium reprocessing. The current mission is environmental cleanup and installation dismantling and decommissioning.

DHAC Site Lead: Paul Charp, PhD

Action Dates:

Public Health Assessments
FY 1999 - initiation

Health Consultations
Release to the Public of Operable Unit 3 (OU-3) (requested by DOE)
02/06/97 - to DOE for data validation
06/24/97 - final

Conclusions and Impacts:

Release to the Public of Operable Unit 3
At the request of DOE-Rocky Flats, ATSDR provided independent verification of DOE's human health risk assessment for Operable Unit 3 (OU-3). OU-3 consists of 38 square miles of publicly accessible land outside the fenced boundaries of the DOE site. ATSDR recalculated radiation doses received by individuals who have access to the land. These recalculations were based on different assumptions, dose conversion factors, and risk coefficients. ATSDR subsequently concurred with DOE's overall findings of the risk assessment:

1. Concentration of heavy metals in environmental media (surface water, groundwater, and soils) are below levels that pose a health hazard.
2. Concentrations of uranium and radium are present at naturally occurring levels and are not expected to result in adverse health effects.
3. Concentrations of the various cesium and strontium radioisotopes associated with either fallout or fission processes are not at levels that pose a health hazard.

4. Concentrations of plutonium and americium in surface water and groundwater are well below the proposed drinking water standards and are not considered health hazards.
5. Evaluation of radioactive constituents detected in the OU-3 indicates that these levels do not pose a public health hazard.

Additional evaluation confirmed that current DOE actions are protective of public health.

Health Education:

Working with CDC's National Institute for Occupational Safety and Health (NIOSH), ATSDR will develop and implement an educational program for health-care providers serving the Rocky Flats work force. The program will (1) inform health-care providers of health effects associated with exposures likely to be experienced by the workers and (2) train health professionals to record an exposure history.

Savannah River Site
Aiken, South Carolina

Type Site: NPL, Petitioned
Size: 192,323 acres (300 square miles)
Facility Status: Active
Facility Mission: The mission is and has been to produce tritium, plutonium, and other special nuclear materials used for national defense. Savannah River Site also produces nuclear material for the space program, medical and industrial uses, and research efforts.

DHAC Site Lead: Michael Grayson, MS

Action Dates:

Public Health Assessments
FY 1998 - initiated

Health Consultations

Metallurgical Laboratory
08/12/93 - final

M Area
08/12/93 - final

F-, H-, K-, and P- Area Acid/Caustic Basins
02/07/94 - final

D-Area Seepage Basin
06/07/94 - to classification review
07/12/94 - initial release for data validation
09/13/94 - final

Conclusions and Impacts:

Initial remedial actions for M-Area and the metallurgical laboratory were evaluated by ATSDR to determine if the measures protect public health. ATSDR concluded that the measures were protective of human health.

ATSDR evaluated concentrations of eight metals in the acid/caustic basins and concluded that the concentrations did not pose a public health hazard.

ATSDR completed a health consultation on dioxin levels in the D-Area Seepage Basin on September 13, 1994. ATSDR evaluated the health implications to workers exposed to dioxin while implementing a removal action at the D-Area Seepage Basin. ATSDR determined that, if recommended worker precautions were taken during removal, the dioxin levels did not pose a health hazard to the workers.

ATSDR has conducted needs assessments for communities in the Savannah area. In FY 1999, ATSDR will continue health education activities identified in the needs assessment. Needs assessments are a critical tool for building capacity within a community to address the environmental concerns of affected community members and provide direct input to decisions concerning the health issues related to site releases.

St. Louis Airport
St. Louis, Missouri

Type Site: NPL, FUSRAP, petitioned
Size: 32.7 Acres
Facility Status: Inactive mission, active remediation
Facility Mission: The past mission was storage of low level radioactive wastes produced by the Manhattan Project. The current mission is remediation.

DHAC Site Lead: Paul Charp, PhD

Action Dates:

Public Health Assessments
05/23/90 - initial release for data validation
05/10/91 - public comment release
01/20/94 - final

Conclusions and Impacts:

At the time of the assessment, concentrations of radon and thorium at the site were not present at levels that would be a health threat. Because data for past concentrations were unavailable, ATSDR considered the St. Louis Airport Site an indeterminant *past* public health hazard. ATSDR recommended that DOE completely characterize the groundwater, surface water, sediment, air, and soils for chemical and radiological contamination and implement dust control measures. As a result of the recommendations, additional characterization of the local watershed was performed and dust control measures were improved.

Weldon Spring Quarry/Plant/Pits
Weldon Spring, Missouri

Type Site: NPL
Size: 215 acres
Facility Status: Active remediation; inactive production
Facility Mission: 1941–1946: Army trinitrotoluene (TNT) and dinitrotoluene (DNT) ordnance works
1947–1954: Inactive
1955–1966: Atomic Energy Commission uranium feed materials plant
1967–1985: Army re-occupied site
1985–present: DOE responsible for remediation

DHAC Site Lead: Michael Grayson, MS

Action Dates:

Public Health Assessments
05/09/95 - to classification review
06/30/95 - initial release for data validation
09/30/96 - public comment release
06/30/97 - final

Health Consultations

Review of Fish Data - Chemical Plant Site (requested by DOE)
04/24/89 - final

Review of Draft Record of Decision (ROD) for Bulk Wastes (requested by DOE)
01/20/94 - final

Francis Howell High School
07/13/94 - to classification review
07/29/94 - initial release for data validation
09/15/94 - final

Technical Assistance
02/10/93 - Responded to EPA request for assistance on the health implications of lead, arsenic, and mercury levels in fish.

1993 - Responded to DOE request to evaluate the public health implications of the "Proposed Plan for Remedial Action at the Chemical Plant Area of the Weldon Spring Site."

Conclusions and Impacts:

Public Health Assessments

In the public health assessment ATSDR evaluated available environmental monitoring data obtained from DOE, the Missouri Department of Natural Resources, St. Charles County, and the U.S. Department of the Army. ATSDR evaluated human exposure pathways to chemical and radioactive contaminants at the site. ATSDR also evaluated health information from the Missouri Department of Health to address community health concerns. ATSDR presented the following conclusions

1. Air monitoring conducted at the site boundary and the high school has shown that airborne radioactive contaminants are not moving beyond the site boundary and that radiation levels at the high school are within normal background ranges.

2. Contaminant concentrations in fish are very low, and occasionally eating fish from the conservation areas does not pose a public health hazard.

3. Groundwater contaminants from the Weldon Spring Quarry have not migrated to the St. Charles County well field, and ongoing remediation at the quarry will further reduce the potential for contaminant migration. Current groundwater monitoring procedures are adequate to determine the distribution of contaminants.

4. Cancer incidence data from the Missouri Cancer Registry indicate that there may have been higher than expected rates of childhood leukemia for several years during 1983–1992. However, the geographical distribution of these cases suggests that they were not associated with contaminant exposures at the chemical plant site. In addition, exposure to the types and levels of contaminants present at the site has not been shown to cause childhood leukemia. ATSDR will work cooperatively with the Missouri Department of Health to further investigate possible environmental factors for the childhood leukemia cases in St. Charles County.

On the basis of these evaluations of environmental data, human exposure pathways, human health outcomes, and community concerns, ATSDR has determined that the Weldon Spring site poses no apparent public health hazard to the community. Access restrictions prevent public exposure to chemical and radioactive contaminants on site. In general, the public is not exposed to chemical and radioactive chemicals off site. However, any exposures to off-site contaminants are expected to be infrequent and short-term and, therefore, do not pose a public health hazard.

Public Health Consultations

Review of Fish Data - Chemical Plant Site

At the request of DOE, ATSDR performed a health consultation focusing on fish at the Chemical Plant Site. The health consultation concluded that heavy metals in fish at the site do not pose a public health hazard to residents who occasionally eat locally caught fish; however, persons who eat fish for subsistence may be at increased risk for adverse health effects.

Record of Decision for Bulk Wastes

At the request of DOE, ATSDR performed a health consultation on the Record of Decision for Quarry Bulk Wastes. The health consultation concluded that the quarry was a public health hazard and that the excavation, transport, and temporary storage of quarry bulk wastes did not present a potential for public exposures to hazardous wastes.

Francis Howell High School

ATSDR conducted public availability sessions on July 11–12, 1994. Health concerns that were expressed at these sessions and in previous discussions with the community focused on the potential for exposure of students and staff at the Francis Howell High School to airborne radionuclides. ATSDR completed a health consultation to address this issue on August 30, 1994, and concluded that no significant exposures are occurring as a result of current site activities. The health consultation relieved stress and anxiety that the community had regarding remediation activities at the Weldon Spring Plant.

Technical Assistance

ATSDR responded to EPA's request for technical assistance on the health implications of lead, arsenic, and mercury levels in fish (February 10, 1993). ATSDR determined that the reported concentrations did not pose a health hazard to persons eating the fish.

ATSDR responded to a DOE request to provide comments on the public health implications of the "Proposed Plan for Remedial Action at the Chemical Plant Area of the Weldon Spring Site." After reviewing the plan, ATSDR found (1) that off-site areas that had radionuclide contamination were not evaluated for non-radiological contamination, and ATSDR recommended further environmental characterization; (2) that proposed cleanup standards for several hazardous chemicals exceed health-based comparison values for children who eat dirt; and (3) that future potential radiation doses were not shown to be within the recommendations of the International Commission on Radiological Protection (ICRP Publication 60).

West Valley Demonstration Project
Cattaraugus County, New York

Type Site: Petitioned
Size: 3,340 acres
Facility Status: Active
Facility Mission: Commercial reprocessing of spent nuclear fuel

DHAC Site Lead: Paul Charp, PhD

Action Dates:

Technical Assistance

09/18/96 - Responded to request from Seneca Indian Nation to provide assistance in reviewing draft Environmental Impact Statement (EIS).

Conclusions and Impacts:

On September 18, 1996, ATSDR responded to a request from the Seneca Indian Nation for assistance in evaluating the DOE's *Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center*.

Each of the proposed alternatives has benefits ranging from complete removal and returning the area to its native state to alternatives that are cost effective. After a review of the draft EIS, ATSDR concluded that Alternatives I and II were protective of public health and posed no public health hazard. Alternatives III and IV, however, would continue to have a direct, but small, impact on the public health of residents on the reservation. Alternative V, abandonment of the site, was unacceptable.

W.R. Grace/Wayne Interim Storage Site
Wayne, New Jersey

Type Site: NPL, FUSRAP
Size: 8.5 acres
Facility Status: Inactive
Facility Mission: The past mission was extraction of thorium from monazite ore and production of rare earths. The present mission is interim storage.

DHAC Site Lead: Carol Connell, BS

Action Dates:

Public Health Assessments
12/10/88 - initial release for data validation
07/30/90 - final

Health Consultations
Pompton Plains, Railroad Spur and Residential Properties (requested by EPA)
11/05/93 - initial release for data validation
01/26/94 - final

Technical Assistance
Review of Wayne Health Study
08/08/95 - final

Conclusions and Impacts:

Health Consultation
Pompton Plains Railroad Spur and Residential Properties
ATSDR concluded that the radiological contamination in the surface soil and in children's sand boxes did not pose a public health hazard. Potential exposure to subsurface contaminants could not be determined because no data were available. ATSDR recommended additional monitoring to determine the extent of radiological contamination.

DOE proceeded with the cleanup of the properties without further characterization; however, monitoring done during remediation indicated extensive contamination. As a result, DOE excavated and disposed of 10 times as much contaminated soil as was previously planned.

Technical Assistance
Review of Wayne Health Study
At DOE's request, ATSDR provided technical comments on the *Wayne Health Study* prepared by Radioactive Waste Campaign, Inc., for the Township of Wayne.