



# Activities in South Carolina



## ATSDR in Partnership With South Carolina

The Agency for Toxic Substances and Disease Registry (ATSDR) is the lead public health agency responsible for implementing the health-related provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). ATSDR is an Atlanta-based federal agency with more than 400 employees and an annual budget for 2002 of \$78 million. ATSDR is responsible for assessing the presence and nature of health hazards at specific Superfund sites, helping to prevent or reduce further exposure and illnesses resulting from those hazards, and expanding the knowledge base about the health effects of exposure to hazardous substances.

ATSDR works closely with state agencies to carry out its mission to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and disease related to toxic substances. ATSDR provides funding and technical assistance to states and other partners through cooperative agreements and grants to identify and evaluate environmental health threats to communities. These resources enable state and local health departments and other grantees to further investigate environmental health concerns and to educate communities. From **fiscal years 1987 through 2002**, ATSDR awarded more than **\$4.1 million** in direct funds and services to **South Carolina** for comprehensive support of its environmental health unit. In addition to direct funds and services, ATSDR staff provides technical and administrative guidance for state-conducted site activities.

## ATSDR Site-Specific Activities Public Health Assessment-Related Activities

One of the agency's important mandates is to conduct **public health assessments** of all National Priorities List (NPL) sites and of other sites where a significant

threat to public health might exist. **Twenty-eight** sites have been designated to the NPL in **South Carolina**.

A **public health assessment** is a

written, comprehensive evaluation of available data and information on the release of hazardous substances into the environment in a specific geographic area. Such releases are assessed for current or future impact on public health. ATSDR, in collaboration with public health and environmental officials from **South Carolina**, has conducted **46** health assessments in the state. Following is a recent example of a public health assessment conducted in the state.

- **Aqua-Tech Environmental, Inc.**—ATSDR awarded funds to the **South Carolina Department of Health and Environmental Control (SCDHEC)** to conduct a public health assessment of this site in **Greer** to evaluate its public health significance. In the past, the site was a hazardous waste treatment, storage, and disposal facility as well as a municipal landfill and a general dump site for local residents.

The health assessment, released in March 2001, classified the site as no apparent health hazard. This classification means that no data were found to indicate that area residents or others near the site were being exposed to any site-related chemicals above levels of concern.

A **health consultation** is a written or oral response from ATSDR to a specific request for information about health risks related to a specific site, chemical release, or hazardous material. It is a more limited response than a public health assessment is. To date, **91** documented health consultations have been conducted at **50** sites in **South Carolina**. Following are examples of health consultations conducted in South Carolina.

*From fiscal years 1987 through 2002, ATSDR awarded more than \$4.1 million in direct funds and services to South Carolina.*

- International Minerals and Chemicals (IMC) and Arkwright Dump Sites**—The U.S. Environmental Protection Agency (EPA) asked ATSDR to review and evaluate analytical data for contaminants in on-site and off-site surface soil, sediments, and home dust near these sites in **Spartanburg**.

IMC is a former fertilizer production facility in a mixed residential, industrial, and undeveloped area; the Arkwright dump received municipal, automotive, and medical waste until 1972.

Samples of surface soil, sediments, and home dust were analyzed

for metals, dioxins, and some soil nutrients.

The purpose of a health consultation released in September 2002 was to address possible health effects to current residents living near the sites.

ATSDR classified this site as an indeterminate public health hazard because the environmental data were insufficient. The extent of dioxin and lead contamination in surface soil and dust on surfaces in homes have not been fully characterized; likewise, data characterizing the extent of lead contamination in surface soil are limited.

- Ditch Sampling Data**—The Bureau of Land and Waste Management with the **South Carolina Department of Health and Environmental Control (SCDHEC)** asked the **Division of Health Hazard Evaluation (HHE)** to evaluate the potential health risks associated with wading and playing in three drainage ditches near the former **Myrtle Beach** Air Force Base. These ditches historically received runoff from the closed base. Surface water and sediment samples were collected from the ditches and analyzed for metals, polychlorinated biphenyls (PCBs),



*ATSDR staff member collecting a well water sample at a home in Simpsonville/Fountain Inn.*

pesticides, and volatile organic compounds (VOCs).

Sediment and surface water samples evaluated for a health consultation released in October 2002 contained a few pesticides, including DDT, chlordane, and mirex. None of the pesticides

were found in sediment above screening levels. Most of the pesticides were not above detection limits and were given as estimated concentrations. ATSDR classifies this playing and wading in the ditches at this site as no public health hazard.

An **exposure investigation** collects information on specific human exposures

through biologic sampling, personal monitoring, related environmental assessment, and exposure-dose reconstruction. ATSDR and staff from **South Carolina** have conducted several exposure investigations in the state. Following is a recent example of several exposure investigations conducted at one site in South Carolina.

- Simpsonville/Fountain Inn**—Testing conducted by **SCDHEC** in early 2001 found elevated levels of uranium in water from some private wells in **Simpsonville** and **Fountain Inn**. The uranium was naturally occurring and not a result of industrial pollution. In April 2001, an exposure investigation (EI) was conducted in this community. The purpose of this first EI was to assess human exposure to uranium from drinking water. This EI documented the presence of elevated concentrations of uranium in many of the private wells that were tested and in urine uranium levels of well owners.

A second EI was conducted in October 2001, 8–10 months after participants reported that they had stopped drinking the well water. Because 90% of the residents in the first EI had elevated urine uranium levels, the purpose of this follow-

up EI (which led to two published EIs released in March 2002) was to assess changes in body burdens of uranium and possible kidney effects.

Seventy-nine (75%) of the 105 residents who participated in the first EI also participated in the second. The majority (95%) of persons whose urine was analyzed to assess possible kidney effects had normal levels of retinol binding protein (RBP), indicating that uranium had either no adverse effects on the kidneys or that the effects were reversible.

Analysis of urine uranium testing results found significantly elevated urine uranium concentrations in 90% of the EI participants. These concentrations decreased in most (63%) of the participants; they increased in 37% of the participants. For most of those with increased concentrations, the increase was small, but four participants had large (greater than twofold) increases.

Further followup was needed, however, because the majority of participants in both exposure investigations had urine uranium levels above the 90th percentile of the general U.S. population. This followup was needed to determine the long-term effects, if any, that could result from this exposure.

A third EI was released in September 2002. This EI, 14–16 months after most of the participants stopped drinking the well water, had two components. In the first component, ATSDR and SCDHEC repeated urine uranium assays in all members of one family. In this family, four of five persons had a twofold to eightfold increase in their urine uranium level between the first and second EIs. The purpose of this testing was to determine if the urine uranium levels were still increasing in this family and, if so, why. In the

second component, ATSDR repeated the test for RBP in the three persons whose RBP was elevated in the second EI.

Urine uranium concentrations decreased by 95% in the four members of the family who previously had increases in urine uranium. These concentrations decreased in seven (88%) of eight participants in the third EI; concentrations in five (63%) of the eight exceeded the 90th percentile for urine uranium levels in the general U.S. population. The urine uranium concentration increased in one participant, but a detailed exposure history and medical history did not identify any contributors to this increase.



***ATSDR staff member preparing urine sample at a home in Simpsonville/Fountain Inn.***

SCDHEC will submit a proposal to obtain funding from ATSDR to conduct a community health investigation to assess the health impact of exposure to uranium from drinking water on the residents of Simpsonville/Fountain Inn. As a result of these investigations, water lines have been established in this area; therefore, many of the residents are no longer exposed to well water.

### **Health Education and Community Activities**

South Carolina has been a participant in ATSDR's cooperative agreement program since 1987. Under this program, SCDHEC has received funding and technical assistance for the development of community education and activities associated with hazardous substances in the environment. Since April 2002, more than 600 South Carolina residents have attended 46 environmental health education seminars, workshops, town meetings, or other programs. Thirty-one educational tools were developed in support of this activity. Examples of recent environmental health activity include the development, production, and distribution of more than 25,000 copies of the 2002 South Carolina fish consumption advisories.

Through a national cooperative agreement with the **Migrant Clinicians Network (MCN)**, ATSDR

provides assistance to health care providers working with migrant and seasonal farm workers. MCN, the second-largest clinical network in the nation, brings together clinicians from various professions to meet the needs of migrant and seasonal farm workers. Seven MCN member clinics throughout **South Carolina** provide support to migrant workers and their families.

## Health Studies

Health studies are investigations conducted to determine the relationships between exposures to hazardous substances and adverse health effects. They also define health problems that require further investigation through, for example, health surveillance or an epidemiologic study. Following is an example of a health study that ATSDR conducted or supported in the state of **South Carolina**.

- **Impact of Trichloroethylene (TCE) Exposure on Oral Motor, Speech, and Hearing in Children**—In 1989, ATSDR began enrolling eligible individuals in the TCE Subregistry of the National Exposure Registry. Four thousand forty-one living individuals—including 357 children who were 10 years of age or younger—were enrolled. Analyses of the health information at the baseline data collection indicated an excess of hearing impairments and speech impairments in this particular age group. Given the known and suspected effects of TCE on cranial nerves, it was felt that additional information was needed to adequately address the excesses of speech and hearing disorders. The **University of South Carolina**, under a cooperative agreement with ATSDR, examined the impact of low-level, long-term TCE exposure on oral motor, speech, and hearing (OSH) status in children less than 14 years of age. To identify OSH status, screening and in-depth assessments were conducted on TCE-exposed children from the TCE Subregistry, and on a nonexposed, age-matched control group, using the baseline information from the TCE Subregistry.

The study found that exposed children had significantly higher rates of abnormal dentition, high palatal arch, abnormal outer cochlear hair cell function in the left ear only (indicated by failure of otoacoustic emission screening), and absence of acoustic reflexes in both ears,

ipsilateral and contralateral (indicated by failure of acoustic reflex screening). However, in-depth tests, analysis by gestational TCE exposure, and analysis using three exposure categories weakened the hypothesis that all of these outcomes, except for acoustic reflex impairment, were caused by TCE exposure. The absence of an acoustic reflex appears to be associated with TCE exposure.

When grouped by age, no differences in OSH function were found between the exposed and control groups. When children exposed during gestation were compared with children exposed later in life, no differences in oral motor, speech, and hearing test results were detected.

## Resource Materials

ATSDR develops materials that public health professionals and medical care providers can use to assess the public health impacts of chemical exposures. Resources are available in print, on the ATSDR Web site, and on CD-ROM. For example, medical management guidelines are available for acute chemical exposures to more than 40 chemicals. ATSDR's toxicological profiles comprehensively describe health effects; pathways of human exposure; and the behavior of more than 250 hazardous substances in air, soil, and water at hazardous waste sites. In the last 5 years, more than **15,200** of these profiles have been sent to requesters, including representatives of federal, state, and local health and environmental departments; academic institutions; private industries; and nonprofit organizations in **South Carolina**. ATSDR has also developed extensive resources for community members.

***For more information, contact ATSDR toll-free at 1-888-42ATSDR (1-888-422-8737) or visit the ATSDR Web page at [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov).***