Health Consultation

MCCALLIE HOMES

CHATTANOOGA, HAMILTON COUNTY, TENNESSEE

JULY 11, 2002

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

You May Contact ATSDR TOLL FREE at
1-888-42ATSDR
or
Visit our Home Page at: http://www.atsdr.cdc.gov

HEALTH CONSULTATION

McCALLIE HOMES

CHATTANOOGA, HAMILTON COUNTY, TENNESSEE

Prepared by:

Tennessee Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

BACKGROUND AND STATEMENT OF ISSUES

In 1954, the Chattanooga Housing Authority (CHA) built 47 multi-unit buildings, along with an office/maintenance building and a community center, in the Alton Park section of Chattanooga. In 1956, the Housing Authority built an additional 32 multi-unit buildings. The development was called McCallie Homes. Structural problems in the buildings have been evident for many years, but have gradually worsened. As a consequence, demolition of McCallie Homes began in 1999. The land on which the McCallie Homes reside is now part of a Hope VI project that will provide private and public residential housing and will help to revitalize the area. A map of McCallie Homes is attached.

The first two buildings, 5 and 21, were demolished between July 8, 1997, and September 22, 1997, after a fire in 1995 destroyed them. Building 33 was demolished between March 29, 1999, and May 27, 1999, after a fire in 1998 destroyed it. Seven buildings were demolished between October 28, 1999, and November 15, 1999; these buildings were numbered 4, 6, 10, 11, 16, 22, and 29. Between May 15, 2000, and December 20, 2000, twelve buildings were torn down; these buildings were numbered 9, 12, 14, 15, 34, 35, 40, 47, 62, 78, 79, and 82. The remaining buildings will be torn down soon after the 31 families still residing at McCallie Homes are relocated in June 2002.

The footprints of 35 buildings contain foundry sand in the foundation. Of these 35 buildings, 14 have been torn down. Foundry sand was found under the slabs of some of the buildings, but was not reported as an environmental concern. It had been common in Chattanooga to use foundry sand as fill. When foundry sand is found at a project, it is common, with the full knowledge and approval of the Tennessee Department of Environment and Conservation (TDEC), to replace such foundry sand and continue with construction. The footprints of those buildings where foundry sand was discovered were covered with soil and left in place.

Soil was analyzed at 40 areas at the 52- acre site of the McCallie Homes beginning in February 2002 by a consulting firm for CHA, Barge Waggoner Sumner and Cannon (BWS&C). Polychlorinated biphenyls (PCBs), Resource Conservation and Recovery Act (RCRA) Metals, Toxic Characteristic Leaching Procedure (TCLP) lead, semi-volatile compounds, and volatile compounds were the chemicals of interest. The purpose of the testing was to find locations of shallow rock and unsuitable soil prior to the construction of new housing at the site. Surface soil was not tested at that time. All areas with foundry sand in the footprint exceeded the U.S. Environmental Protection Agency's (EPA's) screening level of 400 parts per million (ppm) for lead in soil at residential properties; however, the soil tested was subsurface soil. Footprints without foundry sand were below the screening level [EPA, 1998]. See the table for soil concentrations of lead in the footprints, and the map for the layout of McCallie Homes.

TDEC and CHA entered into a Brownfields Agreement on April 30, 2002. Under the Brownfields Agreement, the Housing Authority will remediate, remove, and properly dispose of the foundry sand and all contaminated soil so that the site is suitable for residential use. At the time of the agreement, TDEC had no data to indicate the presence of surface contamination.

On May 8, 2002, the Tennessee Division of Superfund (DSF) and BWS&C performed an initial site inspection at the McCallie Homes site. TDEC instructed BWS&C to collect four surficial samples, three in bare spots located in former building footprints and one in the playground. No lead contamination above 400 ppm was found in the playground area; the level of lead found in the playground was 61.8 ppm. Lead concentrations for buildings 12, 14, and 21 were 1589 ppm, 2173, and 1543, respectively [BWS&C].

On May 15, 2002, TDEC recommended placing a cover over the bare areas and the collection of additional samples. BWS&C took additional samples at each end of the footprint of 17 buildings on May 15, 2002. They covered the exposed areas with a straw mulch on May 17, 2002. On May 20, 2002, BWS&C contracted with the Earthscape Company of Chattanooga to apply a thicker layer of soil, seed, and mulch on the footprints with bare soil. This was done on May 21 and 22, 2002.

On May 15, 2002, TDEC asked Bonnie Bashor with the Tennessee Department of Health (TDH) if there was a need for blood lead testing in children who are living or had lived in the McCallie Homes after demolition of buildings began. DSF and TDH personnel visited the McCallie Homes site on May 21, 2002.

DISCUSSION

Lead in Surface Soil

Data for surface soil lead concentrations is summarized in Table 1. The lead levels vary from a low of 4.5 ppm on the playground to a high of 3,261 ppm at the east end of the Building 11 footprint. Hot spots are interspersed with areas with low levels of lead. See the map for the location of lead contaminated footprints.

When buildings were demolished, the footprints were covered with soil at the end of the demolition period. Grass soon grew and presently covers most of the footprint area. Table 1 lists the approximate percent grass cover for those footprints with elevated lead levels in the surface soil (top three inches). Percent grass cover was estimated on June 4, 2002, and is assumed to be conservatively representative of percent grass cover since demolition of the buildings. Grass cover over areas of lead contamination mitigates exposure to lead by keeping dust from being inhaled and by limiting the amount of soil that inadvertently gets on the fingers of playing children, thereby decreasing the ingestion rate of lead contaminated soil.

Use of the mean, geometric mean, or upper 95% confidence level of the mean to determine risk is not applicable in this situation. Sampling was not random; sampling locations were chosen to represent those areas with foundry sand contamination, except for a very few sites (playground, ballfield, Buildings 5, 6, and 22). Therefore, the probability of elevated blood lead levels was qualitatively estimated from the surface soil lead levels, the percent grass cover of those areas with lead contamination, the percent of area represented by the contaminated footprints, and

historical blood lead levels of children living at McCallie Homes. There is no reason to suppose that children play exclusively at any one site.

In 1997, buildings 5 and 21 were demolished. The Building 5 footprint has very low concentrations of lead in the surface soil and presents no lead hazard to children. Surface soil analyses for lead in footprint 21 varies between 246 ppm at the west end to 1543 ppm at a bare spot, to 1109 ppm at the east end. Footprint 21 had only 30% grass cover in May 2002. Until spring 1999, this was the only footprint with lead contamination.

In the spring of 1999, building 33 was demolished. Lead concentrations in surface soil vary between 663 ppm at the east end to 1821 ppm at the west end. This footprint is approximately 80% covered with grass. It is at the far end of the complex from footprint 21. It is unlikely that small children would play at both footprint 21 and footprint 33.

In the winter of 1999 and the spring of 2000, seven more buildings were demolished - buildings 4, 6, 10, 11, 16, 22, and 29. Of these buildings, only footprints 4, 10, and 11 showed elevated levels of lead in the surface soil. The lead concentration in soil in footprints 4 and 10 is mildly elevated, with concentrations of lead ranging from 720 ppm to 829 ppm. Footprint 11 has the highest concentration of surface lead found at the site, 3261 ppm at the east end of the footprint. The west end of the footprint has low concentrations of lead - 356 ppm. Grass cover ranges from 90% at footprint 4 to 80% at footprints 10 and 11. Footprints 6, 16, 22, and 29 present no lead hazard to children.

In the spring, summer, and fall of 2000, twelve more buildings were demolished - buildings 9, 12, 14, 15, 34, 35, 40, 47, 62, 78, 79, and 82. Of these buildings, only footprints 15 and 47 showed low levels of lead that present no hazard to children. Concentrations of lead in surface soil at the other footprints range from 815 ppm at the west end of footprint 9 to 2675 ppm at the west end of footprint 34. Percent cover ranges from 50% at footprint 34 to 90% at footprint 14.

Blood Lead Testing

The Chattanooga/Hamilton County Health Department has screened capillary blood lead levels of 47 children living in McCallie Homes from 1995 to the present. Of those tested, 44 were below the 10 µg/dL (micrograms per deciliter) level that CDC considers of concern. One child had a capillary level of 11 µg/dL, another had a capillary level of 12 µg/dL, and another child's sample clotted and was unable to be analyzed. Capillary blood lead levels have a very high rate of false positives, that is, they show a level above 10 µg/dL when they are actually below that level. None of the three children with either a slight elevation or a clotted sample returned for a venous blood lead level. The geometric mean of blood lead levels of these children is 4 µg/dL.

The pediatric nurse at Alton Park Clinic has provided anecdotal information that no elevated blood lead levels have been found in children living at McCallie Homes. The clinic finds so few elevated blood lead levels that the elevated levels are remembered.

ATSDR Child Health Initiative

In 1996, the Agency for Toxic Substances and Disease Registry (ATSDR) launched an initiative to place a special agency-wide emphasis on environmental hazards to children's health and to emphasize child health in all agency programs and activities. The initiative was begun because of the special vulnerabilities of children when they are exposed to hazardous substances [ATSDR, 1997; ATSDR 1998].

Children six years old or younger are more sensitive to the effects of lead than adults. At low levels of exposure, a child's mental and physical growth may be affected. The Centers for Disease Control and Prevention (CDC) considers a blood lead level of 10 micrograms per deciliter (μg/dL) to be of concern [ATSDR 1999]. TDH used the potential exposure of children to the lead found in the soil as a guide in assessing this site.

CONCLUSIONS

1. Ten of 22 footprints of demolished buildings had surface soil lead concentrations above 400 ppm.
2. Completed exposure pathways exist.
3. However, several factors mitigate the potential public health threat:
    a. Not all footprints were contaminated with lead.
    b. The contamination was not uniform throughout the footprints.
    c. Footprints have had grass cover, ranging from 30% to 90%.
    d. The area of the contaminated footprints is 2.4% of the total open area at McCallie Homes.
    e. Blood lead levels of children living at McCallie Homes indicate that any exposure to lead in contaminated fill in the footprints of demolished buildings did not result in elevated blood lead levels. There is no current need for additional, focused blood lead sampling of the former residents of McCallie Homes.
4. No apparent public health hazard exists from lead in the surface soil at the McCallie Homes site.

RECOMMENDATIONS

1. The regulatory agencies should continue to remove and dispose of the contaminated surface soil at the McCallie Homes site.

2. The bare soil left behind after the demolition and disposal activities should be covered with clean soil and reseeded with grass.

PUBLIC HEALTH ACTION PLAN

Actions Completed

All bare areas have been covered with a mulch, soil, and seed mixture.

Actions Planned

1. Relocate all residents by mid-June 2002.
2. Complete demolition of remaining buildings by February 2003 is planned.
3. Proper removal of contaminated sand, soil, and fill by November 2002 is planned.
4. Proper disposal of contaminated sand, soil, and fill by November 2002 is planned.

PREPARED BY:

Bonnie S. Bashor
Director, Environmental Health Studies and Services
Communicable and Environmental Health Services
Tennessee Department of Health

REFERENCES

Agency for Toxic Substances and Disease Registry. Healthy Children - Toxic Environments. Report of the Child Health Workgroup Presented April 28, 1997 to the Board of Scientific Counselors.

Agency for Toxic Substances and Disease Registry. Promoting Children's Health, Progress Report of the Child Health Workgroup, Board of Scientific Counselors, 1998-1999.

Agency for Toxic Substances and Disease Registry. Toxicological Profile for Lead. July 1999.

Barge, Waggoner, Sumner, and Cannon, personal communication. May 2002.

US Environmental Protection Agency. Clarification to the 1994 Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. EPA/540/F-98/030. 1998.

Table 1
Surface Soil Concentration of Lead
Footprints of Demolished Buildings
McCallie Homes
Chattanooga, Hamilton County, Tennessee

Duration of Demolition	Building Number (Direction of Sample)	Lead Concentration (ppm)	Percent Grass Cover [2]	Date Sampled
	01 (bare spot)	1,253		May 16, 2002
	Ballfield (composite [1])	6.6		May 17, 2002
	Playground	61.8		May 8, 2002
	Playground	4.5		May 15, 2002
July 8, 1997 - Sept. 22, 1997	05 (east end composite)	31.2		May 16, 2002
July 8, 1997 - Sept. 22, 1997	05 (west end composite)	43.3		May 16, 2002
July 8, 1997 - Sept. 22, 1997	21 (composite)	1,543	30	May 8, 2002
July 8, 1997 - Sept. 22, 1997	21 (east end composite)	1,109		May 15, 2002
July 8, 1997 - Sept. 22, 1997	21 (west end composite)	246		May 15, 2002
Mar. 29, 1999 - May 27, 1999	33 (east end composite)	663	80	May 15, 2002
Mar. 29, 1999 - May 27, 1999	33 (west end composite)	1,821		May 15, 2002
Nov. 15, 1999 - May 12, 2000	04 (north end composite)	720	90	May 16, 2002
Nov. 15, 1999 - May 12, 2000	04 (south end composite)	728		May 16, 2002

Nov. 15, 1999 - May 12, 2000	06 (east end composite)	12.9		May 16, 2002
Nov. 15, 1999 - May 12, 2000	06 (west end composite)	8.0		May 16, 2002
Nov. 15, 1999 - May 12, 2000	10 (east end composite)	794	80	May 16, 2002
Nov. 15, 1999 - May 12, 2000	10 (west end composite)	829		May 16, 2002
Nov. 15, 1999 - May 12, 2000	11 (east end composite)	3,261	80	May 16, 2002
Nov. 15, 1999 - May 12, 2000	11 (west end composite)	356		May 16, 2002
Nov. 15, 1999 - May 12, 2000	16 (east end composite)	44.4		May 16, 2002
Nov. 15, 1999 - May 12, 2000	16 (west end composite)	226		May 16, 2002
Nov. 15, 1999 - May 12, 2000	22 (east end composite)	12.3		May 15, 2002
Nov. 15, 1999 - May 12, 2000	22 (west end composite)	11.6		May 15, 2002
Nov. 15, 1999 - May 12, 2000	29 (east end composite)	327		May 15, 2002
Nov. 15, 1999 - May 12, 2000	29 (west end composite)	148		May 15, 2002
May 15, 2000 - Dec. 20, 2000	09 (east end composite)	1,304	85	May 16, 2002
May 15, 2000 - Dec. 20, 2000	09 (west end composite)	815		May 16, 2002
May 15, 2000 - Dec. 20, 2000	12 (composite)	1,589	80	May 8, 2002
May 15, 2000 - Dec. 20, 2000	12 (east end composite)	1,301		May 16, 2002

May 15, 2000 - Dec. 20, 2000	12 (west end composite)	1,325		May 16, 2002
May 15, 2000 - Dec. 20, 2000	14 (composite)	2,173	90	May 8, 2002
May 15, 2000 - Dec. 20, 2000	14 (east end composite)	1,974		May 16, 2002
May 15, 2000 - Dec. 20, 2000	14 (west end composite)	1,939		May 16, 2002
May 15, 2000 - Dec. 20, 2000	15 (east end composite)	202		May 16, 2002
May 15, 2000 - Dec. 20, 2000	15 (west end composite)	290		May 16, 2002
May 15, 2000 - Dec. 20, 2000	34 (east end composite)	2,017	50	May 15, 2002
May 15, 2000 - Dec. 20, 2000	34 (west end composite)	2,675		May 15, 2002
May 15, 2000 - Dec. 20, 2000	35 (east end composite)	1,714	70	May 15, 2002
May 15, 2000 - Dec. 20, 2000	35 (west end composite)	2,248		May 15, 2002
May 15, 2000 - Dec. 20, 2000	47 (north end composite)	203		May 15, 2002
May 15, 2000 - Dec. 20, 2000	47 (south end composite)	252		May 15, 2002

[1] a composite sample consists of 4 grab samples collected in the 0-3 inch soil horizon

[2] percent grass cover was determined for those footprints with lead levels above 400 ppm

Map


McCallie Homes
Chattanooga, Hamilton County, Tennessee
Footprint of demolished bldg
No evidence of foundry sand
Footprint of demolished bldg
Lead <400 ppm
Footprint of demolished bldg
Lead >400 ppm
Playground
Very low lead
47
40
35
34
33
82
79
78
Play-
ground
29
9
10
11
12
14
6
5
15
4
16
22
21
N
100 0 100 200 Feet

CERTIFICATION

This McCallie Homes Health Consultation was prepared by the Tennessee Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

Alan W. Yarbrough

Technical Project Officer, SPS, SSAB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

Richard Gillig

for Chief, State Program Section, SSAB, DHAC, ATSDR