

Letter Health Consultation

HAMBURG RESIDENTIAL LEAD SITE

HAMBURG, BERKS COUNTY, PENNSYLVANIA

**Prepared by
Pennsylvania Department of Health**

APRIL 16, 2014

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
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.

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LETTER HEALTH CONSULTATION

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Prepared By:

Pennsylvania Department of Health
Division of Environmental Health
Under a cooperative agreement with the
Agency for Toxic Substances and Disease Registry



April 16, 2014

Mr. Todd Richardson
On Scene Coordinator
Hazardous Site Cleanup Division
U.S. Environmental Protection Agency
1650 Arch Street (MS: 3HS31)
Philadelphia, PA 19103

Dear Mr. Richardson,

On March 18, 2014, you requested that the Pennsylvania Department of Health (PADOH) review the data presented (X-ray Fluorescence (XRF) – lead screening values) in the EPA Action Memo for a residential property on 6th Street in Hamburg and determine if a public health hazard exists to support an EPA removal action. Based on XRF lead screening data and visible battery fragments, exposure to lead in the yard's soil poses an urgent public health hazard—especially for children. PADOH recommends taking steps to reduce residential exposures to lead as soon as possible. Although XRF sample results were not verified for lead using a laboratory method, historical sampling has shown elevated lead in area soil when fragments of battery casings are present. Therefore, this evaluation assumed the XRF lead values are valid.

BACKGROUND

A resident owns the Hamburg Residential Lead Site located on 6th Street in Hamburg, Windsor Township, Berks County, PA. The approximate 1.5- acre property consists of a roughly 2,000 square foot house, two car garage, gravel driveway, vegetable garden (40'x40'), children's play area, a firewood shed, and dog and chicken pens. The property adjoins other residential properties and a partially wooded property.

During the removal assessment, approximately 25 randomly selected soil sample locations on the property were screened for lead using an XRF. Fourteen locations revealed lead concentrations between 648 and 31,600 ppm. The highest XRF reading was from the driveway between the house and garage. The property owner has visiting grandchildren. The yard is mostly grass covered and is in good condition. Lead in plant beds around the house ranged from non-detected (ND) – 8,000 ppm with some battery fragments found. The children's play area (sand box, sliding board, fort (ND – 38 ppm) and back corner of house by a basketball hoop (ND – 60 ppm) were also screened for lead with the XRF. The fenced garden area had more battery fragments than rocks on the surface.

DISCUSSION

Exposure to lead in surface soil may occur via incidental ingestion or inhalation of lead-contaminated dust and soil particles. Young children and fetuses are especially sensitive to the toxic properties of lead.

Factors accounting for this susceptibility include: (1) the immaturity of the blood-brain barrier which may allow transport of lead into the immature nervous system; (2) hand-to-mouth behavior and pica behavior which leads to consumption of lead-contaminated media; (3) enhanced gastrointestinal absorption of lead (affected by the nutritional status of the child); (4) low body weight; and (5) the ready transfer of lead across the placenta to the developing fetus. These factors put children exposed to lead at a much higher risk of developing adverse health effects from lead-contaminated soils than adolescents and adults.¹

Studies indicate that ingestion and inhalation of lead-contaminated media can contribute to elevated blood lead levels. Until recently, the U.S. Centers for Disease Control and Prevention (CDC) had established a level of concern for case management of 10 micrograms lead per deciliter of blood ($\mu\text{g/dL}$).² Recent scientific research, however, has clearly shown that blood lead levels below this value can cause serious harmful effects in children. In 2012, CDC's Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP) recommended that CDC adopt the 97.5 percentile blood lead level of children in the United States (ages 1 to 5 years old) as the reference value in children, which currently is 5 $\mu\text{g/dL}$.³ CDC is using the reference value of 5 $\mu\text{g/dL}$ to identify high-risk childhood populations and geographic areas most in need of primary prevention. However, this may still represent an underestimation of risk for lead because there is no proven safe level of lead in the blood.

The EPA Integrated Exposure Uptake Biokinetic (IEUBK) model predicts blood lead levels in children based on soil lead levels and other default exposures to lead. Running this model with the maximum level found in this investigation (31,600 ppm) predicts a child blood lead level of 77 $\mu\text{g/dL}$, with 100% of predicted blood lead levels being above 5 $\mu\text{g/dL}$. Running the model with the garden area maximum concentration (8,000) predicts a child blood lead level of 35 $\mu\text{g/dL}$, with 99.9% of predicted blood lead levels being above 5 $\mu\text{g/dL}$. Although these levels of environmental exposures associated with blood lead levels above 30 $\mu\text{g/dL}$ are above the range of values that have been used in the calibration and empirical validation of the model, they represent an appreciable risk of increased blood lead levels in children. The IEUBK model results indicate the potential for blood lead levels reaching those requiring immediate medical attention. Experts recommend chelation therapy when a child's blood lead level is greater than or equal to 45 $\mu\text{g/dL}$.³

CONCLUSIONS

Based upon the review of the available screening data, PADOH concludes the following:

- Lead is present in the surface soil at levels of an urgent public health hazard at the Hamburg Residential Lead Site on 6th Street.
- The presence of battery fragments may harm people's health via direct exposure.
- Secondary contamination of private residences can occur via the tracking of contaminated soil indoors.

¹ Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Lead (Update)*. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. 2007 <http://www.atsdr.cdc.gov/toxprofiles/tp13.html>

² U.S. Centers for Disease Control and Prevention (CDC 2005). Preventing Lead Poisoning in Young Children (5th Revision). Atlanta: U.S. Department of Health and Human Services.

³ U.S. Centers for Disease Control and Prevention (CDC 2012a). Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention: Report of the Advisory Committee on Childhood Lead Poisoning Prevention, Centers for Disease Control and Prevention. U.S. Department of Health and Human Services, January. Available at: http://www.cdc.gov/nceh/lead/acclpp/final_document_010412.pdf

- The extent and nature of contamination at the Hamburg Residential Lead Site on 6th Street has not been completely characterized. This conclusion is based on XRF screening data.

RECOMMENDATIONS

PADOH recommends the following:

- Reduce people's exposure to high lead levels in soil.
- Remove and/or restrict people's access to visible battery casings in residential areas.
- Ensure that the full extent of contamination at the Hamburg Residential Lead Site on 6th Street has been addressed via confirmatory sampling, including laboratory analysis.
- Parents with children over 6 months of age that visit the property on a regular basis need to have their child's blood tested for lead. In addition, adults living at the residence should discuss whether or not they should have a blood lead test with their primary care provider.
- Reduce exposure to lead as much as possible, including having residents take the following actions:
 - Establish a clean hands policy – educate family members, especially children, on the importance of washing their hands when coming in from working or playing outside and before eating.
 - Provide children with a covered sand box and discourage them from playing in the soil.
 - Maintain a healthy grass or sod cover on play areas. Bare play areas, such as those under a swing set or sliding board, can also be covered with woodchips, mulch, or clean sand.
 - Do not eat or smoke in areas with contaminated soil.
 - Avoid tracking soil into the house on shoes and clothing and by household pets. Remove shoes by the door, and frequently bathe pets as they could also track contaminated soil indoors.
 - Regularly conduct damp mopping and damp dusting of surfaces. Dry sweeping and dusting could increase the amount of lead-contaminated dust in the air.
 - If you have carpets, use a vacuum with a High Efficiency Particulate Air (HEPA) filter. Vacuuming without this type of filter can increase the amount of lead-contaminated dust in the air.

Sincerely,



Barbara Allerton, MPH, BSN, RN
Epidemiology Research Associate

Cc: Lora Werner, ATSDR Region 3
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Report Preparation

This LHC was prepared by the PADOH under a cooperative agreement with the ATSDR. It is in accordance with the approved agency methods, policies, and procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented.

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