



Agency for Toxic Substances and Disease Registry  
Region 3  
1650 Arch Street, 3HS00  
Philadelphia, PA 19103

September 17, 2013

Ms. Kelley Chase  
On Scene Coordinator  
Hazardous Site Cleanup Division  
U.S. Environmental Protection Agency, Region 3  
1650 Arch Street (MS: 3HS31)  
Philadelphia, PA 19103

Dear Ms. Chase,

This letter is in response to your August 15, 2013, request that the Agency for Toxic Substances and Disease Registry (ATSDR) evaluate—from a public health perspective—the need for further environmental characterization at the Nanticoke Municipal Recreation Park site in Luzerne County, Nanticoke, PA.

The Nanticoke Municipal Recreation Park site is owned by the City of Nanticoke. The City acquired the property after severe flooding in the site area in the 1970s. The site was in use from the 1990s until recently as a youth soccer field and parking area. Former uses of different portions of the 40 acre property prior to the 1970s included a municipal landfill, scrap yard, and residences. In May 2011, three individual subsurface soil samples (collected from approximately twelve inches in depth across the center line of the soccer field) identified lead contamination (up to 1440 mg/kg) and arsenic (up to 25.5 mg/kg). Obvious fill material was encountered at the twelve inch depth. Three surface soil samples were also reportedly collected at the same time/same locations and were reported to be non-detect for lead and arsenic. However, these surface soil results have not been provided to EPA or ATSDR to date. As a result of the contamination found at this site, the City recently closed the soccer field. However, the park site is still accessible to the public, and there is pressure to reopen the fields (because these are the only soccer fields in the city).

Research findings suggest that childhood, as well as prenatal (i.e., developing fetus), exposure to lead can adversely affect the health of young children, those six years of age and less, as well as the developing fetus, because both are considered more vulnerable to lead poisoning than adults. The reasons for a young child's increased vulnerability to lead poisoning are due to: 1) children's developing central nervous system; 2) hand-to-mouth behavior exhibited by children increases the ingestion rate for either lead contaminated soil, dust or paint chips; 3) children's efficiency of lead absorption from the gastrointestinal tract is greater than adults; and 4) iron and calcium deficiencies that are prevalent in children may enhance the absorption and increase the toxic effects of lead. [ATSDR. Toxicological Profile for Lead. August 2007. <http://www.atsdr.cdc.gov/ToxProfiles/TP.asp?id=96&tid=22>].

Chronic exposure to low lead levels in children has been shown to cause effects on the central nervous system, which can result in deficits in intelligence, behavior, and school performance.

Health effects from lead exposure in children and unborn fetuses include both physical and mental impairments, hearing difficulties, impaired neurological development, and reduced birth weights and gestational age. Some health effects from lead exposure, such as impaired academic performance and motor skills, may become irreversible and persist, even when blood lead concentration returns to below 10 µg/dL. While there is some discrepancy in the scientific literature between the exact decreases in IQ points associated with a rise in BLL in children, the weight of scientific evidence supports the hypothesis that there is an inverse relationship. It has been hypothesized that the age of exposure, the younger being more susceptible to neurological disorders, is a factor. More research is needed to further delineate the effect of low level lead exposure, particularly on children. [CDC. Childhood Lead Poisoning Prevention Program <http://www.cdc.gov/nceh/lead/about/program.htm>]. Several studies have observed that low lead level exposure during the developmental stages can possibly produce lifelong changes, such as loss of intelligence in younger children, including:

1. Jusko, et. al found children's intellectual functioning at 6 years of age is impaired by blood lead concentrations well below 10 µg/dL. [Jusko TA, et.al. Blood lead concentrations < 10 µg/dL and child intelligence at 6 years of age. *Environ Health Perspect.* Feb 2008; 116(2):243-8. <http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info:doi/10.1289/ehp.10424>].
2. A study by Candfield, R.L., et al concluded that IQ declined by 7.4 points as lifetime average BLL concentrations increased from 1 to 10 µg/dL. [Canfield, RL. Et al. Intellectual Impairment in Children with Blood Lead Concentrations below 10 µg per Deciliter. *New England Journal of Medicine.* 348:1517-1526. *April 17, 2003.* <http://www.nejm.org/doi/full/10.1056/NEJMoa022848>]
3. Lanphear, B.R. et al found environmental lead exposure in children who have blood lead levels < 7.5 µg/dL is associated with intellectual deficits. [Lanphear, Pet al. Low-Level Environmental Lead Exposure and Children's Intellectual Function: An International Pooled Analysis. *Environ Health Perspective* 113(7): 2005 <http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info%3Adoi%2F10.1289%2Fehp.7688> ].

Although exposures to indoor dust at the site is not the primary exposure source on the site, residents that have young children should take precautions to avoid tracking in potentially contaminated soil into their home. **A blood lead test is the most useful screening and diagnostic test for evaluating a possible exposure to lead.** Therefore, as a prudent public health practice, blood lead tests are recommended for pregnant women, women trying to become pregnant, and children six years of age and younger. [CDC. Childhood Lead Poisoning Prevention Program <http://www.cdc.gov/nceh/lead/about/program.htm>]. PADOH and ATSDR suggest that parents monitor their children's behavior while they are playing outdoors to ensure that their children (of any age) are not exhibiting pica behavior and eating excessive amounts of soil and discuss their concerns and/or observed behaviors with their health care provider.

Therefore, ATSDR concludes that lead levels in surface soils on the soccer field are unknown while lead levels beneath the surface (approximately 12 inches) are elevated. Additional delineation of lead levels in surface soil and subsurface soil are necessary to make a public health determination. In the interim, actions to mitigate park visitors' exposures to lead should be

implemented. As such, ATSDR concurs that further environmental characterization is needed at this site to better define the extent of contamination. ATSDR recommends that additional actions should be implemented at this site to mitigate exposures.

If you have any additional questions, feel free to contact me.

Sincerely,



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cc: Dr. Sharon Williams-Fleetwood, ATSDR  
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