

Site: Former Mohr Orchard

Location: Schnecksville, Lehigh County, PA

Cost Recovery #: 3ALG

Requester and Affiliation: OSC Richard Fetzer, EPA R3

Activity: ATSDR Record of Activity (AROA) Health Consultation

Author: Deborah Burgin, ATSDR Division of Regional Operations, Washington D.C. office

Date: 6/9/09

Statement of Request: On February 17, 2009, U.S. Environmental Protection Agency (EPA) On-Scene Coordinator Richard Fetzer requested that the Agency for Toxic Substances and Disease Registry (ATSDR) perform a public health evaluation of the analytical data from six surface soil samples collected primarily from undisturbed orchard areas on the Former Mohr Orchard Site. These samples were collected to investigate possible "dioxin" (polychlorinated dibenzodioxins) and furan (polychlorinated dibenzofurans) contamination.

Narrative:

Site Location and Description –The Former Mohr Orchards site is located in a mixed use (commercial, residential, agricultural, and industrial) area on the east and west sides of state route 309 in Schnecksville, Lehigh County, Pennsylvania. The former orchard is approximately 1.5 square miles in area and the current site boundaries are defined as all areas formerly used as orchard. The site topography is generally defined as rolling hills with a number of small creeks and tributaries in the valleys of these hills. Large portions of the site remain undeveloped or agricultural including substantial portions that are undeveloped, former orchards. Other developed areas of the site are primarily residential, except along route 309, where the land is mixed residential, commercial and industrial.

Background and Site History –In 2008, as a result of a concern raised by a resident and a follow up request from ATSDR, EPA began an investigation of potential environmental contamination from the historical orchard activities in this area. As part of this ongoing investigation, EPA was requested by a resident of North Whitehall Township to investigate dioxin contamination that might be related to historical use of pesticides and herbicides on the orchard property. This Technical Assistance (TA) document specifically addresses this question about dioxin levels in a subset of soil samples from the site area.

Public health support for this site is being provided by both ATSDR and our cooperative agreement partners at the Pennsylvania Department of Health (PADOH). ATSDR Region 3 is currently in the process of finalizing an ATSDR Record of Activity Health Consultation (AROA-HC) review of the arsenic and lead soil sampling data from this site. It is expected that under cooperative agreement with ATSDR, PADOH will complete an additional health consultation which will incorporate both this TA document and the ATSDR R3 AROA-HC to more fully evaluate exposures to residents at the site via both the soil and groundwater exposure pathways.

Data Objectives and Summary –In November 2008, EPA contractors collected six surface soil samples from primarily undisturbed former orchard areas. Replicates from each soil sample were sent to three different analytical labs and tested for pesticides, dioxins and furans, and herbicides.

Dioxin and dioxin-like compounds (DLCs) are structurally related polyhalogenated aromatic hydrocarbons. Toxicity equivalency factors (TEF) have been developed to compare relative toxicities of the various dioxin and dioxin-like congeners. One of the most potent of these is 2,3,7,8-TCDD, which is assigned a TEF of 1, while other congeners have TEFs less than 1. The purpose of these factors is to be able to assess the equivalent toxicity of a mixture of multiple dioxin-like compounds.

Dioxin and furan results were compared to ATSDR Policy Guideline for Dioxins and Dioxin-Like Compounds in Residential Soil. If one or more soil sampling values exceed the screening level of 0.05 ppb or 50 ng/kg toxicity equivalents (TEQ), further evaluation may be needed. However, health risks associated with levels of dioxins in soil below 1 ppb (or 1000 ng/kg) would be low under most scenarios where the primary exposure pathway is incidental ingestion through direct exposure to soil. EPA's preliminary remediation goal for dioxin in soil is 1 ppb. None of the results from the six surface soil samples were above the screening level of 0.05 ppb.

The soil samples were also analyzed for persistent pesticides and herbicides. Results for dieldrin, 4,4'-DDE (J qualified), and 4,4'-DDT exceeded EPA R3's residential soil screening levels. (Although data with a J qualifier are an estimated value, they can be used for risk assessment purposes.) The reported levels of dieldrin were below ATSDR's soil comparison values for children and adults. The concentrations in all six soil surface samples slightly exceeded ATSDR's cancer risk evaluation guide (CREG) of 2 ppm for 4,4'-DDE. The concentrations in three of the six soil surface samples slightly exceeded ATSDR's CREG of 2 ppm for 4,4'-DDT. The highest levels for 4,4'-DDE were between 2.5 and 5 ppm, and the highest level for 4,4'-DDT was 2.3 ppm. CREGs are media-specific comparison values used to identify concentrations of cancer-causing substances that require further site-specific evaluation. To develop CREGs, the assumption is made that exposure to the estimated concentration occurs continuously over a lifetime. The International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence for the carcinogenicity of DDT in humans (IARC 1974, 1987, 1991). Epidemiological studies are available on the cancer risks associated with exposure to DDT; however, due to exposure to multiple pesticides and the small size of the study groups, it is not possible to draw definitive conclusions from these studies (IARC 1991). Given the location of these samples (undisturbed former orchards), the reported soil concentrations, and the lack of daily exposure, ATSDR does not expect potential episodic exposures to the levels of pesticides/herbicides reported in the six samples to result in adverse cancer or non-cancer health effects in children or adults. If future use is changed which involves daily contact with the soil, this pathway would need to be re-evaluated.

Conclusions:

Based on the limited soil sampling results reviewed and the current use of the property, ATSDR concludes that exposure to dioxin and dioxin-like compounds through incidental ingestion to soil at the Former Mohr Orchard site is not expected to harm people's health. This determination is

based on the evidence that the chemical concentrations are below levels likely to be associated with an adverse health effect and because exposure to the chemicals is infrequent and/or limited.

Recommendations:

- Incorporate the results from this document into future public health reviews of information for this site.
- Re-evaluate the findings if the use of the property changes to residential or to a scenario of use that allows daily contact with the soils.

Signatures:

Signature: Deborah Burgin Date: 6/8/09

Deborah Burgin, Ph.D. Toxicologist, ATSDR DC

Concurrence: Lora Siegmann Werner Date: 6/8/09

Lora Siegmann Werner, MPH Senior Regional Representative, ATSDR R3

References:

Update to the ATSDR Policy Guideline for Dioxins and Dioxin-Like Compounds in Residential Soil (2008). <http://www.atsdr.cdc.gov/substances/dioxin/policy/>

EPA Region 3 Risk-Based Concentration Table (2009).
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm

