



# Lead Arsenate Soil Sampling Guidance for Homeowners





## Introduction

Lead arsenate pesticides were used to control insects in orchards from the 1890s to the 1960s and research has shown that the lead and arsenic can remain in the soil long after the pesticide was used. Health concerns associated with lead and arsenic in former orchard soil are from long-term exposure via inhalation and ingestion. Avoiding contact with soil is the most important step you can take to minimize exposure (see the *DATCP FAQ on Lead and Arsenic in Soil at Old Fruit Orchards* at [http://datcp.wi.gov/Environment/Water\\_Quality/Lead\\_Arsenate/Factsheets\\_and\\_Info/index.aspx](http://datcp.wi.gov/Environment/Water_Quality/Lead_Arsenate/Factsheets_and_Info/index.aspx) for more details). Sampling the soil on your property can help identify any areas where precautions should be taken to avoid exposure.

## Who should sample their soil?

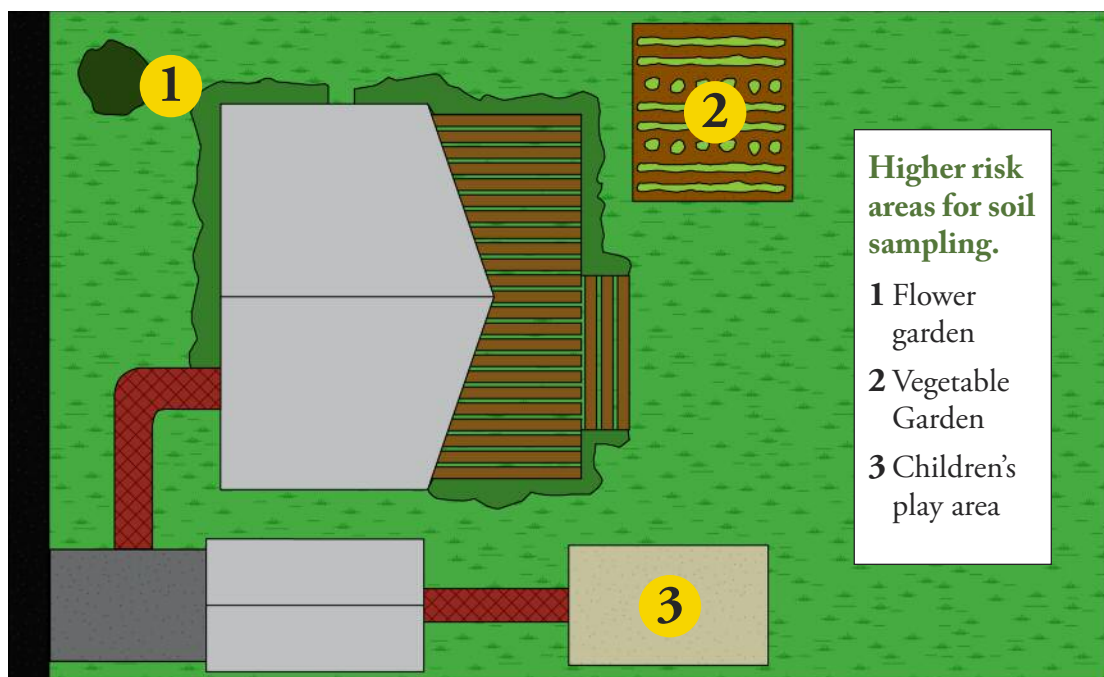
Soil sampling on your property is optional. If you live on, own, or are considering buying or selling property that was formerly a fruit orchard, you can sample your soil to determine the concentrations of lead and arsenic that may be present. With soil sample results you can take measures to reduce exposure to any lead and arsenic that are present on your property and also determine if any further actions are needed.

## Planning the soil sampling

### *Deciding where on the property to sample*

The levels of lead and arsenic in soil can vary considerably across a property so it is important to consider the most important areas to sample. Areas where children play present a higher risk of exposure, especially if there is bare soil. Other areas where family members may have contact with soil include vegetable gardens and flower beds. You should draw a diagram of your property such as the example in Figure 1 to show where various features are and help identify where to sample.

*Figure 1. Example site diagram for soil sampling*



### *How many samples to collect*

The size and use of the areas on your property will help you determine how many samples you should collect. You should consider collecting four samples in each of the areas, such as a children's play area, identified as having a higher risk of exposure for children and other family members. Having multiple sample results from these areas can give you a better understanding of the risk of exposure you or your children will have while playing or working there. Having multiple samples can also give you a better estimate of the average and range of concentrations in an area. Divide each area into four equal sub-areas and collect one sample from each.



### *Composite sampling*

The more individual samples you take from an area, the more information you will have about the concentrations of lead and arsenic in that area. However, taking a lot of samples in the lower-risk areas of your property, such as areas with a solid cover of grass, can be expensive. In these lower-risk areas an alternative is to take composite (mixed) samples. With composite sampling, several samples of equal size are collected from an area and then mixed together to form one composite sample. This composite sample will provide an average concentration for the area sampled but will not provide information on the range of concentrations that may be present. Composite sampling is acceptable as a way to save on testing costs for lower-risk areas, but individual samples are better for higher-risk areas.

To better understand individual sampling versus composite sampling, consider a higher-risk and a lower-risk area of your property. In the higher-risk area you should collect four individual samples, one from each of four equal-sized sub-areas. In the lower-risk area, you would also collect four samples from the sub-areas, but you would then mix them to form one composite sample to send to the lab.

### *Finding a lab*

Samples should be submitted to a lab that is Wisconsin-certified to perform lead and arsenic analyses. A list of these labs can be found on the ***DATCP lead arsenate web page*** at <http://datcp.wi.gov/uploads/Environment/pdf/labs.pdf>. You can also contact the ***Wisconsin Department of Natural Resources (DNR)*** lab certification program at **608-267-7633** for a current list of certified commercial labs that can test for lead and arsenic in soil.

Check with the lab before shipping samples to be sure that they can perform the analyses you want and if they require a specific type of sample container. For soil samples specify that you need a level of detection of 5 parts per million or less for arsenic and 50 parts per million or less for lead.

## **Collecting soil samples**

### *Safety measures for collecting soil samples*

Take the following steps to avoid potential exposure to lead and arsenic when collecting soil samples:


- ☞ Wear gloves.
- ☞ Limit dust by dampening the soil before you sample or wear a dust mask.
- ☞ Wash hands and face after sampling.
- ☞ Wash clothing separately from other laundry if it becomes dirty.

### *Equipment needed*

- ☞ Plastic or stainless steel trowel
- ☞ Plastic or stainless steel mixing spoon
- ☞ Stainless steel or plastic bucket for mixing soil
- ☞ Permanent marking pen
- ☞ Sample containers from the lab or small zip lock bags
- ☞ Plastic wash bucket, scrub brush and soap

### *Collecting the samples*

For each sampling location, first remove any vegetation, wood chips, or gravel to expose the soil and assure that only soil is included in the sample. Collect a sample from the top six inches of soil with the clean trowel and place it in a clean bowl or bucket. Use a clean spoon to mix the soil until it is uniform and place about one cup (or other amount if specified by



the lab) of the mixed sample in a separate clean sample container or bag. Write the sample name (for example “vegetable garden northwest quarter”) as well as your name and the collection date on the container. All sampling equipment should be cleaned with soap and water and rinsed before collecting subsequent samples.

For composite samples, collect individual samples of equal size from each of the four sub-areas in the area you are sampling, place them all together in the clean bowl or bucket, and thoroughly mix all the soil. Then place the specified amount for one sample in the sample container or bag as explained above.

When collecting samples, use a diagram of the property to show each sample location relative to other permanent landscape features to help you remember where each sample was collected. You may also want to keep a written list of all samples and their locations. The map and list will help you relate the sample results to the locations where the samples were collected. For composite samples, indicate in the sample name, diagram and list of samples that this is a composite sample. Also note how many individual samples went into the composite sample and show on the site diagram where each individual sample came from.

Mail or deliver the samples to the laboratory following their instructions. Send soil samples to the lab in a clean plastic container or bag that is labeled with the sample name, your name, and the date sampled. On a separate form also include your name, phone number, mailing address and the analyses requested such as total lead and total arsenic or as specified by the lab. Follow any additional instructions provided by the lab.

### Interpreting the results

Your soil test results will probably be given in units of milligrams per kilogram (mg/kg) which is the same as parts per million (ppm). Soil samples collected from orchards or former orchards where test results exceed background levels for arsenic (approximately 5 ppm) or 50 ppm for lead are considered to be contaminated at “pesticide use levels” and should be reported to DNR and/or DATCP. More thorough investigation and management of these soils may be required.

Concentrations that exceed 100 ppm arsenic or 400 ppm lead may be evidence of former spillage or evidence of a former pesticide mixing and loading location. Locations having these concentrations should be reported to DNR and/or DATCP and require more thorough investigation and cleanup measures.

Remember that composite sample results give you the average of the concentrations in the individual samples that made up the composite sample. If the results of a composite sample show high levels of lead or arsenic, you may want to resample that area using four individual samples to better determine the concentrations in the area.

You may report evidence of known arsenic or lead contamination by submitting your analytical test results to DATCP at Agricultural Chemical Cleanup Program, PO Box 8911, Madison, WI 53798-8911. Staff at DATCP can help you interpret your soil sample results and decide if any further steps are necessary. Call (608) 224-4514 for further assistance.

