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## How and Why to Measure Soil Contaminants in Urban Settings

**S**oil contamination can come in many forms and is often the by-product of human activities that deposit hazardous materials to the soil. Soil contaminants include PCBs, PAHs, petroleum products, heavy metals, pesticides and more. There are different analytical procedures for measuring each type of contaminant in the soil, so it is important to know what could potentially be present in your soil in order to use the appropriate procedure to measure it.

A little detective work is needed to identify which contaminants are likely to be in your soil since it would be very expensive to test the soil for all contaminants. The first step is to get a history of the property and neighboring areas. After identifying all possible pollutants, use the following summary of waste categories to get help.

**Chemical, Biological, and Radioactive Waste** Chemical waste includes nonradioactive chemical solids, liquids, or other waste contaminated with hazardous chemicals. The source and type of chemical waste can vary widely, and detection and clean-up can be costly.

Biological waste is material that is capable of self-replication, and has the capacity to produce deleterious effects upon biological organisms. This includes materials containing bacteria, fungi, viruses, parasites, allergens, and other potentially hazardous agents. Contamination is often naturally occurring, but can be the result of poor sanitation, poor hygiene, or improper disposal of medical waste.

Radioactive waste contains radioactive material and is usually the by-product of nuclear power generation and other applications of nuclear fission or nuclear technology used in research and medicine.

For assistance with chemical, biological, or radioactive soil contamination, contact either your local board of health, state department of environmental protection, or conduct an internet search to locate an appropriate lab and assistance with clean-up if necessary.

**Petroleum Products** Petroleum products such as gasoline and heating oil are highly combustible. Additionally, they contain polyaromatic hydrocarbons (PAHs) which are toxic and can cause cancer if consumed. In the case of a spill of ten gallons or more, contact your local fire department and your state's department of environmental protection immediately.

**Pesticides and Herbicides** High levels of pesticides (e.g. PCBs, and DDT) and herbicides may be found where they were used to manage pests and weeds, or in the event of improper disposal. If you suspect your soil has been

contaminated by herbicides or pesticides, contact the National Pesticide Information Center (NPIC) at 800-858-7378, or visit [www.npic.orst.edu](http://www.npic.orst.edu).

**Toxic Heavy Metals** Elevated levels of toxic heavy metals are primarily found in populated areas, and are usually the result of industry or other human activity. Due to the past use of lead-based paint and tetraethyl lead in gasoline, an elevated level of lead in soil is not uncommon in populated areas. Toxic levels of lead and arsenic can also be found in soils where apples and other fruit trees were grown due to their use as pesticides in orchards.

Other heavy metals of concern are nickel, copper, cadmium, chromium, zinc, molybdenum, barium and mercury. With the exception of barium and mercury, the UMass Soil and Plant Tissue Testing lab offers testing to measure heavy metals in soil.

**Testing for Lead and Other Heavy Metals** Our Routine Soil Analysis includes a lead screening that measures extractable, or "plant available" lead. In addition, we offer a Total Sorbed Metals Test, which accurately determines total lead levels by EPA methods 3050B and 6010. In addition to lead, total levels of nickel, cadmium, chromium, zinc and copper are measured, with the option of adding arsenic, selenium, and molybdenum for an additional fee.

We recommend that all routine soil test results with an extractable level of 22 ppm or more be tested using the Total Sorbed Metals Test. Reported results correspond to EPA established threshold levels for lead in soils.

It should be noted that children under the age of six and pregnant women are at a higher risk for lead exposure. Soil from gardens and play areas used by these individuals should be submitted for analysis using the Total Sorbed Metals Test where elevated lead levels are suspected.

For further information about soil lead, and recommendations for good gardening practices, see our fact sheet "Soil Lead: Testing, Interpretation, & Recommendations" (<http://soiltest.umass.edu/fact-sheets/soil-lead-testing-interpretation-recommendations>). Order forms for the Routine Soil Analysis and Total Sorbed Metals Test (EPA 3050B) may be found on our website: <http://soiltest.umass.edu/>.