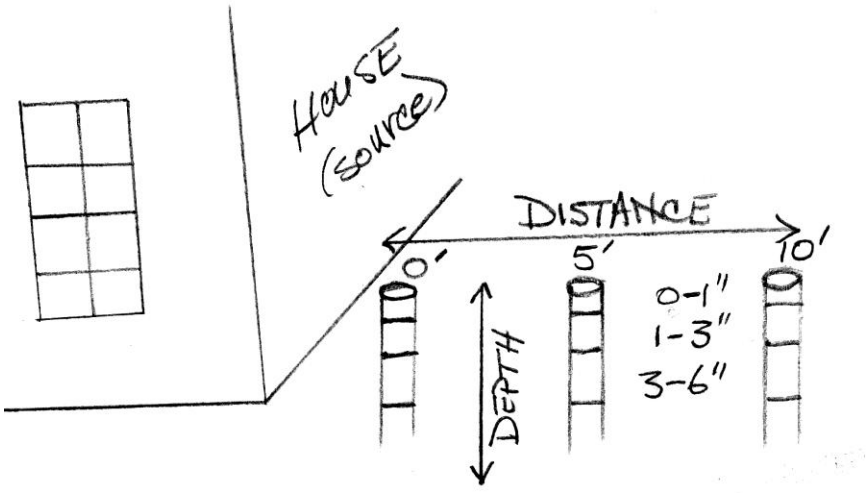
LEAD CONTAMINATION IN URBAN SOILS

CRSS/FANR 3060
LAB 14 Supplement

Lead is a transition ("heavy") metal that has significant chronic toxicity to humans, especially children. It occurs in high concentrations in urban soils due to its use in many manufactured products, in piping, as a gasoline additive (before 1973), and as a white pigment in house paint (before 1977). An on-going source of soil contamination in old neighborhoods is the flaking of lead-based paint as it weathers or is scraped off during re-painting.

In soil sampling for this type of contamination, the house is considered as the "source", and a gradient sampling scheme is used to assess how Pb in soil varies with distance from the house. Since paint chips are initially deposited on the surface, sampling with depth is also important to determine what volume of soil is affected by the deposition of the paint chips.



Lead in point chips is in the form of lead carbonate ($PbCO_3$), which is readily soluble in dilute acids. Thus, we can extract a small soil sample with dilute nitric acid (0.1 M HNO_3), measure the Pb in the extract using atomic absorption spectrometry (AAS), and calculate the Pb level in the original soil. US EPA has established two ciritcal Pb concentrations in soils: 400 ppm (mg Pb/Kg soil) is a "chronic" hazard level, and 1200 ppm is the "acute" level. The levels are based on the hazard to children of directly ingesting (eating) contaminated soil.

Using the samples provided in lab taken adjacent to an old house in Athens, make a schematic showing the Pb distribution around this building.

		Distance (ft)		
		0	5	10
Depth (in)	0-1			
	1-3			
	3-6			

Describe a remediation strategy that might be practical to minimize the health threat of this contamination, assuming contact with children is the main hazard; refer specifically to depths and distances.