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and the EPA, can also be used to treat soil contaminated by other heavy metals, such as zinc, aluminum, cadmium and possibly uranium. Lead is viewed as the primary health risk because it is especially harmful to young children.

With the process, lead-contaminated soil is covered with ground phosphate rocks on a ratio of two parts phosphate to one part lead. (To be most effective, the lead content has to be measured ahead of time.) In most cases, the phosphate can be applied to the surface just like fertilizer.

One application is likely to do the job, according to Logan, unless the soil has an extremely high concentration of lead.

For alkaline soils, like those found in the West, an application of liquid phosphate, such as the type found at landscape supply centers, may be the best technique, says Logan.

Using phosphate rocks to treat lead-contaminated soil is different from conventional technologies because it focuses

on managing the lead where it is. Other treatments seek to remove the lead from

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**The technology could drastically reduce the costs faced by business managers who are being forced to purify soils.**

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the soil, which can rob it of important nutrients, Logan points out.

"We took a different approach and focused on managing the lead where it is, which is much more cost-effective and eliminates the need to store the contaminated soil in a landfill or to incinerate it," Logan explains.

"Using this technology will cost hundreds of dollars to treat an acre of contaminated soil compared to thousands or tens of thousands of dollars to treat with any other technology," he reports.

The project began five years ago, and now trials are on tap for urban and rural sites, according to Logan. "Since phosphorous is a fertilizer, we were concerned that crops growing in the soil would take out the phosphorous, and the lead would be soluble and able to move into the groundwater and be absorbed by the crops," he recalls. "But as long as there is an excess of phosphorous, that shouldn't be a problem," Logan adds.

"Another important thing we found was that it worked regardless of what the source of the lead was, including soluble forms of lead, mineral forms, or even leaky batteries."

Phosphate is abundant and easy to mine. "The key to this technology is that it doesn't use another synthetic, man-made chemical," Logan says. "It uses a natural product that we know and understand well to treat a very serious problem in a cost-effective manner."

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## These herbaceous plants are best for shady spots

■ Much of the gardening world hungers for the cooling pleasures of shade trees in their landscape. The rest of the world regrets they cannot plant many of the sun-loving plants which will not thrive in their shady landscapes.

Here are a few favorite plants for various levels of shade.

### Ajuga

- A spreading member of the mint family; can be showy when bright blue flowers appear;
- has many uses as a background groundcover.

### Astilbe

- Feathery flower spikes rise above the dark green dissected foliage. Astilbes give an airy look to garden borders. If flowers are deadheaded, the blooming period will be lengthened.

### Begonia

- These plants range from the widely popular wax begonia bedding plant to an exotic range of fancy hybrid tuberous begonias.

### Climbing hydrangea

- A wonderful climbing vine for along garden walls. This vine with glossy

green foliage and fine, fragrant blooms takes years to develop, but it's well worth the wait.

### Coleus

- This edging and window-box plant has a wild range of foliar colors and patterns, which seem almost incongruous with its preference for shade;
- blue flowers are not a key characteristic.

### Columbine

- Airy blossoms which come in many colors have attractive spurs as a feature;
- excellent for naturalized areas;
- may bring the columbine leaf miner insect.

### Daylilly

- More and more varieties are available each year;
- will bush out if they are cut back somewhat at transplanting. New Guinea impatiens can tolerate less shade than the standard impatiens varieties.

### Lily of the Valley

- Very aromatic, white bell-like flowers;
- multiply and spread over large areas quickly.

### Lilyturf (Liriope)

- Grasslike leaves make this an excellent border plant or groundcover for small areas.

### Primrose

- Easy spring flowers provide the promise of summer warmth with heady aroma;
- will bloom in chilly spring temperatures.

### Vinca minor

- Also known as creeping myrtle;
- a standby groundcover with lavender flowers;
- remains evenly green throughout the year.

### Violet

- An attractive range of plants with mostly heart-shaped leaves;
- attractive in clumps, but can be cultivated to serve as a groundcover.

—Source: Jim Chatfield, writing in the Northeast Ohio Forum of the Professional Grounds Management Society.