



# Safe Gardening, Safe Play, and a Safe Home

## February 2010

This pamphlet was designed for residents living near the Iron King Mine – Humboldt Smelter Superfund Site in Dewey-Humboldt, AZ. The purpose is to provide residents with good health practice tips for the home, lawn and garden work, and play. By following the tips in this pamphlet, residents can greatly reduce their exposure to arsenic as well as to other potentially harmful materials such as pesticides and germs that might be in the soil.

### Introduction

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Some residential yards near the Iron King Mine – Humboldt Smelter Superfund Site are impacted from arsenic and lead contamination from the Site. Until residential soils are cleaned up, the good practice tips in this pamphlet will help reduce exposures to arsenic, pesticides, and germs that might be present in the soil.



### Enjoying Your Lawn and Garden

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Eating fruits and vegetables and getting plenty of exercise are essential parts of a healthy lifestyle. People enjoy many activities on their lawn and in their garden, which provide places both for exercise and for growing fresh fruits and vegetables. Arsenic is a naturally occurring element widely distributed in the earth's crust. Some soils are naturally high in arsenic; however, some soils may have been artificially enriched through human activities. Contaminated soils contain concentrations of elements exceeding the natural background level for local soils. This pamphlet focuses on arsenic-contaminated soils, because arsenic is the most widely distributed and elevated contaminant found at the Iron King Mine – Humboldt Smelter Superfund Site (the "Site").

Home gardening is one of the most popular forms of recreation. Gardening puts people in intimate contact with soil and plants grown in soil. Gardening on arsenic-contaminated soil increases the likelihood of exposure to this potentially toxic element. Activities such as playing, gardening, and working on your lawn can increase your opportunity for exposure even though they are healthful activities. The information in this pamphlet will help you understand how to reduce your chances of exposure so you do not feel you have to give up the outdoor activities that you and your family enjoy. Understand that each property is different. Some of the tips outlined may apply to your situation and some may not.

### Arsenic

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The major source of elevated arsenic in residential yards near the Site is from historic mining and smelting activities. Thus far, the U.S. Environmental Protection Agency (EPA) has removed soil from four contaminated yards and is planning additional residential yard cleanup as part of the Superfund cleanup process. Until the contaminated soil is replaced, residents may reduce their chances of exposure by following the guidelines in this pamphlet.

## Arsenic and Gardening

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Gardening in soil with elevated levels of arsenic has two main issues: cleaning soil from the edible portion of the plant and absorption of arsenic by the plant. It is always a good health practice to wash all fruits and vegetables thoroughly whether they are bought or homegrown. Washing the soil from your homegrown fruits and vegetables is one of the most effective ways of reducing your exposure to not only arsenic but to pesticides and germs.

Most edible plants absorb some small amounts of arsenic, but usually do not contain enough arsenic to be of health concern. The amount of arsenic absorbed by plants can depend on many factors. Some of the most important factors are soil acidity, nutrient content, iron, organic matter, and plant type. Plants can absorb more arsenic if you have acidic soil. Keeping your soil at a near-neutral range (pH 6-7) can help reduce the amount of arsenic absorbed in plants. Maintaining adequate levels of plant nutrients in your soil can help reduce arsenic absorption. Adding a balanced commercial fertilizer to soil can help maintain correct levels of key plant nutrients. Iron can prevent arsenic from being absorbed. The iron combines with arsenic to form iron arsenate, a form of arsenic that is not well absorbed by plants. Increased amounts of organic matter are also helpful; the organic matter binds to arsenic and reduces how much plants take up. Some lawn and garden products contain arsenic, so it is a good idea to check with your lawn and garden store for products that do not contain arsenic.

Plants vary in the amount of arsenic they absorb from the soil and where they store arsenic. Some plants move arsenic from the roots to the leaves, while others absorb and store it in the roots only. Fruit-type vegetables such as tomatoes concentrate arsenic in the roots and very little arsenic is taken up in the edible portion of the plant. Leafy vegetables also store arsenic in their roots, but some is also stored in the stems and leaves. Lettuce and some members of the Brassica plant family such as collards, kale, mustard, and turnip greens store more arsenic in the leaves than do other crops, but not at concentrations high enough to cause concern. Root crops such as beets, turnips, carrots, and potatoes absorb most of the arsenic in the surface skin of the vegetable. By peeling the skins of root crops, you can eliminate the portion of the plant that contains arsenic. Recommendations for conditioning your soil, washing vegetables, and peeling root crops are intended to provide you the property owner with additional options for reducing exposure to arsenic. By following the recommendations in the Tips for Safe Gardening, Safe Play, and a Safe Home section, you can greatly reduce your exposure to arsenic from the soil.

## Tips for Safe Gardening, Safe Play, and a Safe Home

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### Working in the Garden and Yard

- Avoid eating or drinking while working in the yard or garden because contaminated soil and dust might get on your food and you could accidentally swallow it.
- Dampen soils with water before you garden to limit the amount of dust you inhale.
- Avoid working in the yard on windy days, when dust can be stirred up and possibly increase your exposure.
- Consider wearing a mask if you spend time in dusty areas.
- Wash your hands after gardening.
- Wash work clothes to remove dust and dirt.
- Take your shoes off at the door to avoid tracking soil into your home.



## Preparing Fruits and Vegetables

- Clean your hands, cutting boards, and kitchen tools with hot, soapy water and rinse well before and after handling your fruits and vegetables.
- Soak garden produce in cool water and rinse thoroughly until the water runs clear. Commercial vegetable cleaning products are available in supermarkets to help free soil residues from your produce. These products work well with leafy vegetables. Vinegar can also be used for cleaning produce.
- Scrub firm fruits and root crops with a vegetable-cleaning brush to remove dust and dirt before peeling or eating.
- Peel root crops like carrots, rutabagas, radishes, and turnips.
- Wash berry fruits like strawberries and blackberries, and remove the "caps" (the tops of the berries where the stem and leaves attach).
- Buy Some, Grow Some: Eat some fruits and vegetables from your garden and some from the farmer's market or grocery store. Eating a mix of homegrown and commercial products can help reduce your potential exposure.

## Creating Play Areas for Children

- Fill sandboxes with sand or soil from an outside source such as a commercial gardening center.
- Cover bare soil with grass or other material such as mulch.
- Keep children from playing in contaminated soil. The most likely way for children to become exposed to arsenic is from ingesting (eating) dirt.
- Have children wash hands and faces after they play in the yard.

## Cleaning Your Home

- Remove work and play shoes before entering your house.
- Damp-mop floors and wipe down counters, tables, and window ledges regularly.
- To reduce dust levels in the home, consider upgrading your vacuum cleaner bags to those that filter better or simply change your bags more often. Some persons may want to buy a vacuum cleaner with a HEPA (high-efficiency particulate air) filter to better reduce dust levels.
- Wash the soil from homegrown fruits and vegetables before bringing them into your home.
- Keep pets out of areas of contaminated soil. Dogs and cats carry contaminated soil on their feet and fur into the home. Bathe your pets frequently.

