

Fish bones used to decontaminate soil in a lead-poisoned neighborhood

August 15 2011, By Suzane Bohan

There's something fishy going on in West Oakland.

Rows of bulging white, 1-ton sacks of ground fish bone from Alaska are lined up inside a shed in the South Prescott neighborhood. In coming months, workers will till the bones into lead-contaminated soil, where it will bind with the toxic metal as it decays, creating a tiny, harmless crystal.

"It may smell fishy for a few days," said Steve Calanog, the U.S. [Environmental Protection Agency](#) scientist overseeing the nation's first fish-bone lead decontamination of a residential area.

"But it's the smell of change, of a healthy community coming back, of getting rid of lead."

A poisoned neighborhood will become safer for children, and a project that will revitalize yards and gardens and employ local workers could lead to wider use of a relatively cheap, effective decontamination method.

South Prescott, a six-block neighborhood one mile west of downtown Oakland, has the heavy lead contamination found in many urban and industrialized areas.

Some yards have more than five times the federal health standard of 400 parts per million of lead in soil, and the neighborhood on average has

twice as much, EPA tests in 2009 revealed.

Exhaust from now-banned [leaded gasoline](#), peeling lead-based paint in old homes and businesses such as auto repair shops and metal recycling facilities account for much of the contamination.

Lead is a [neurotoxin](#) especially dangerous for young children. It damages developing brains, leading to cognitive and behavioral problems as children grow, among other effects.

Toddlers playing in contaminated dirt pick up lead by ingesting it. And they absorb more of it than do adults.

The fish bone treatment is highly effective, Calanog said. One study found it reduced lead leaching through soil 100-fold.

It works fast, too.

Workers in early July tilled bone into the first test site in Oakland, and it's now safe for residents, Calanog said. In late July, the former weedy vacant lot was landscaped into a small neighborhood park, with a stone patio, walkway, lawn and shrubs, paid for by the EPA.

The larger, two-year, \$4 million project, means full-time jobs for 20 to 30 West Oakland residents, many previously unemployed and most graduates of the Cypress Mandela Training Center.

The primary contractor is SFS Chemical Safety, a local woman-owned business, and other local enterprises are involved in security, garden design, employment screening, solar installation, site maintenance and other services.

Some 150 homes in South Prescott qualify for the lead [decontamination](#).

After the treatment, homeowners can choose to recreate the original landscaping or select a new, equal-cost one.

The fish bone, like other bone, is largely made of calcium and phosphate. As it decomposes, freed phosphate migrates through moistened soil.

It chemically and permanently binds to the toxic metal, creating a microscopic crystal, pyromorphite, that is harmless even if consumed.

The method has been under research for more than 15 years and has been used successfully at to clean up lead at military firing ranges and ordnance test sites.

The fish bone comes from Alaskan pollock, familiar to fans of fast-food fish sandwiches and faux crab.

South Prescott residents told the EPA they preferred the innovative treatment over the traditional approach: hauling tainted topsoil to a hazardous waste landfill and replacing it.

"The community asked to look at a different approach," Calanog said. A South Prescott neighborhood website declared, "We are a forward-looking, environmentally conscious community and want no part of giving our problem to someone else."

The fish bone cleanup costs \$18 a square foot, compared with \$32 a square foot for "dig-and-haul," according to an EPA spokesman.

Calanog regards the South Prescott lead remediation as much a test of social science as of chemistry or geology, because it takes a neighborhood's embrace for it to succeed.

Bruce Beasley, a renowned sculptor and nearly 50-year resident of South Prescott, helped build support for the project as chairman of the neighborhood association.

He sees better health, a rejuvenated neighborhood landscape and improved property values.

The EPA's willingness to modify the project in response to neighbors' concerns was critical to its acceptance, Beasley said.

Neighbors insisted that an arborist watch over rototilling to ensure that prized trees and large shrubs weren't damaged. To escape the noise and smell, residents could stay for free in a hotel during the one to two weeks it takes to treat each yard.

The neighborhood group also won the promise that Calanog, whom Beasley described as "a straight shooter," would remain as EPA's head of the project during its duration.

"The sense of trust is very much directed by the person, not the institution," Beasley said. "That came from our own experience with the government."

The EPA also set up a solar-powered work site with a community library and meeting room and a demonstration garden with landscape options. A biodiesel truck and an electric truck haul equipment and supplies.

Calanog said he'll be working with a few research laboratories to monitor how well the Oakland project cuts residents' lead exposure. If the results show scientific and social success, Calanog hopes it becomes a model for other communities.

"What we're trying to do is show this is accessible to all," he said.

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