Tacoma Smelter Plume

2012 Annual Report

DEPARTMENT OF ECOLOGY
State of Washington

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Purpose of the Report

The purpose of this report is to describe how the Department of Ecology is using the Asarco settlement to clean up the Tacoma Smelter Plume. It provides an update on cleanup progress and efforts to manage human health risks. The report covers:

- The ten-year plan for managing the Asarco settlement.
- Cleanup strategies and priorities.
- Accomplishments and 2012 performance measures.

Asarco Settlement

Asarco's Legacy in Washington

Contamination from smelters and mines

The American Smelting and Refining Company (Asarco) was founded in 1899. Asarco operated two smelters and four mines in Washington, leaving a legacy of contamination.

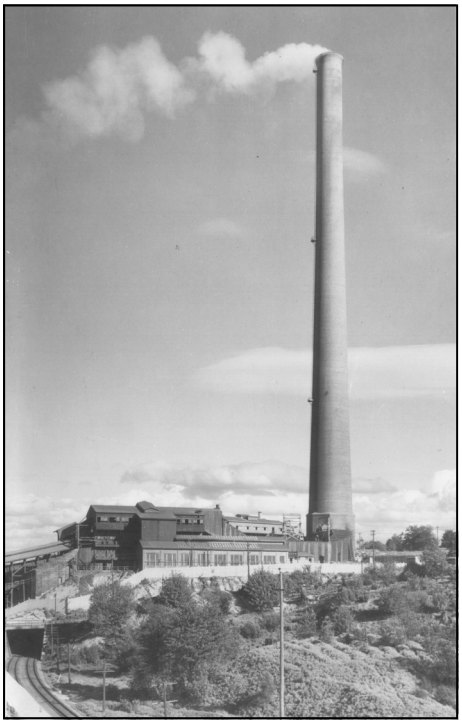
The **Tacoma smelter** operated from 1890 to 1986. The Town of Ruston grew up around it. Air emissions from the smelter contaminated over 1,000 square miles of soils in the Puget Sound region.

The 2009 Asarco Bankruptcy Settlement

Washington becomes part of the nation's largest environmental settlement

In 2005, Asarco declared bankruptcy, largely due to environmental liabilities from its nearly 100 cleanup sites across the country. The State of Washington joined the federal government and other states in a suit against Asarco that spanned four years.

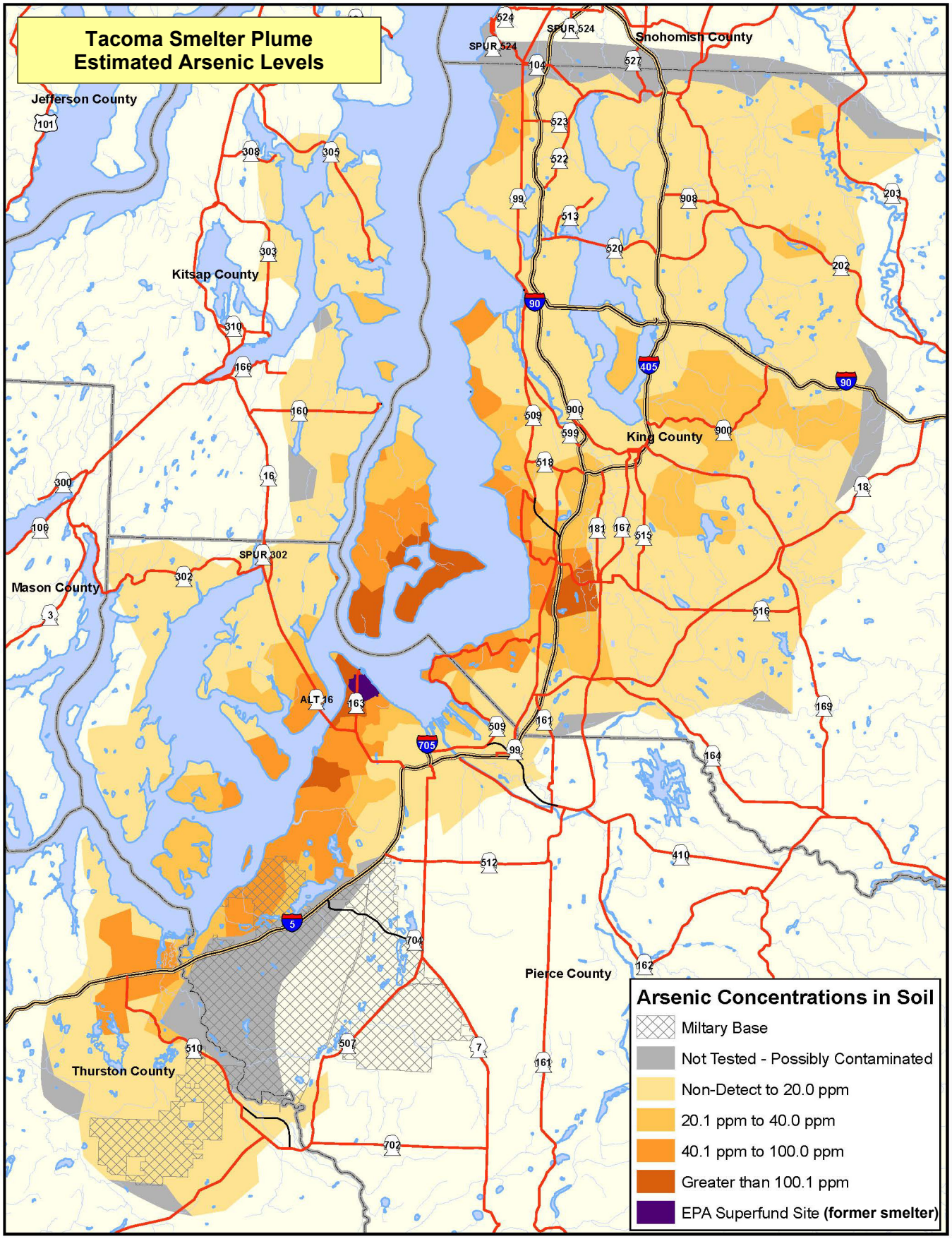
In November 2009, Asarco emerged from bankruptcy, having paid out the largest environmental settlement in U.S. history. The total settlement was $1.79 billion for past and future cleanup costs, and interest earned over the four years. Washington's share was $188.5 million—nearly 90 cents for every dollar claimed.



Tacoma Smelter Plume communities benefit from $94.6 million for cleanup and reducing risk

Asarco settled for $94.6 million for the future costs of cleaning up the Tacoma Smelter Plume. It covers soil cleanup for play areas and residential yards, ongoing outreach, and technical assistance for those voluntarily cleaning up their own properties.

The majority of funds will go to yard cleanup in Ruston, north and west Tacoma, and southern Vashon-Maury Island neighborhoods, which have the highest contamination. See pages 8-9 for more about planned settlement spending.



This map shows estimated concentrations of arsenic in the top six inches of soil. It is based on a relatively small number of soil samples, given the large area that is affected. Property-specific sampling is needed to determine the actual amount of arsenic on a given property. In 2013, Ecology will put out a set of revised maps that show the likelihood of exceeding certain arsenic levels. The new maps will help decide where to focus cleanup efforts.

Tacoma Smelter Plume

Tacoma Smelter Plume at a Glance

Total Settlement: $94.6 million

Counties: Thurston, Pierce, King

Total size: Over 1,000 square miles

Cleanup focus: Surface soils

Former Asarco smelter and its 571 foot smokestack

Tacoma Smelter Plume History

In 1890, a lead smelter began operating on the border of north Tacoma and Ruston. In 1905, Asarco purchased it and converted it to a copper smelter in 1912. Its smokestack emissions dispersed arsenic, lead, and other heavy metals across an 1,000 square mile area—the Tacoma Smelter Plume.

Arsenic and lead are toxic and children are at highest risk. Within the plume, hundreds of thousands of people may be exposed.

Understanding patterns of contamination helps to prioritize cleanup work

The Tacoma smelter specialized in high-arsenic ores and had a 571-foot smokestack—believed to be the tallest in the world when it was built. These factors, along with regional wind patterns and topography, created the broad pattern of contamination shown in the map on page 2.

Arsenic levels are higher closer in to the former smelter and decrease with distance. Areas of higher contamination pose a larger risk to residents. The majority of the $94.6 million settlement will go to soil sampling and cleanup in these neighborhoods.

Early risk management focused on community outreach and play area cleanups

Starting in 2000, Ecology gave funding to health departments in King and Pierce counties. The funding covered education and outreach programs, as well as soil sampling to better understand the plume extent.

The main goals of outreach were to raise awareness and promote “healthy actions”—behaviors to reduce soil exposure, such as hand-washing. The health departments used surveys, focus groups, and other feedback to develop a suite of outreach materials and strategies for reaching children, parents, and care-takers, in particular.

In 2005, the Area-Wide Soil Contamination law (Chapter 70.140 RCW) led Ecology to develop the Soil Safety Program. The program initially provided free soil sampling and cleanup for play areas at schools and childcares. In 2010, using funding from the Asarco settlement, we expanded it to include park, camp, and public multifamily housing play areas.

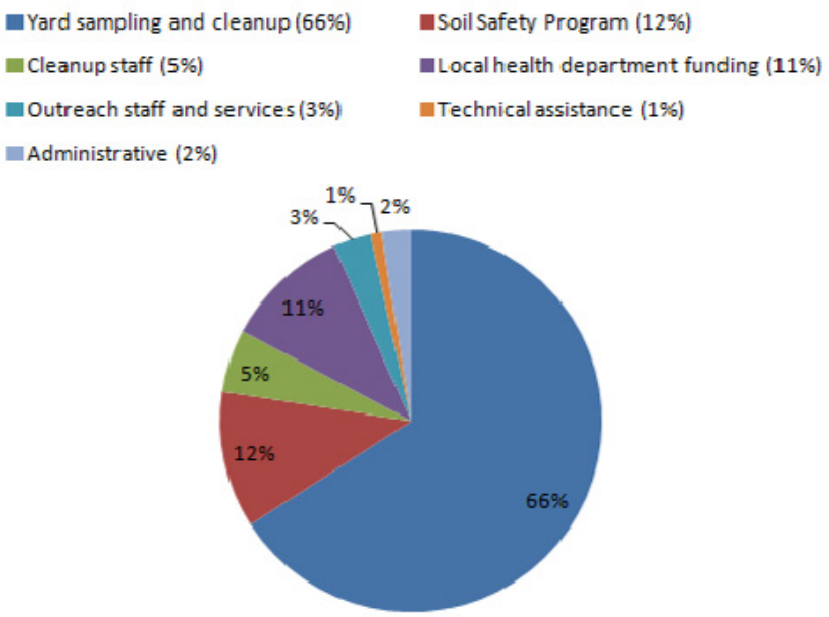
Ten-Year Plan for Managing the Tacoma Smelter Plume

Using lessons learned from earlier outreach and play area cleanup work, Ecology developed a 10-year plan for the Tacoma Smelter Plume Asarco settlement. The plan focuses on four main strategies, which are described in the 2012 Tacoma Smelter Plume Interim Action Plan:

- **Yard cleanups:** Soil sampling and cleanup for existing residential yards in areas of highest contamination.
- **Soil Safety Program:** Continue sampling and cleaning up school, childcare, park, and camp play areas.
- **Outreach and education:** Continue programs at health departments in King, Pierce, and Thurston counties.
- **Technical assistance:** Work with local governments and developers to encourage voluntary cleanup.

The yard cleanup program will use the majority of settlement funds meant for the future cost of cleaning up the Tacoma Smelter Plume (pie chart and table).

Breakdown of the $94.6 million Asarco settlement for the future cost of cleaning up the Tacoma Smelter Plume, over 10 years



Tacoma Smelter Plume 10-year plan budget and activities

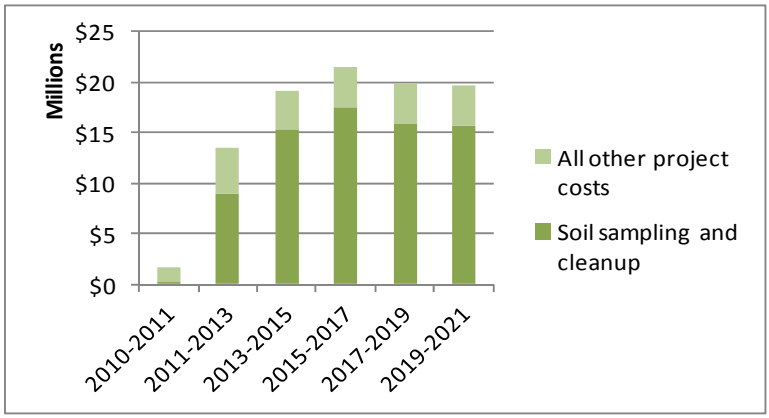
	Budget	Category	Activities and staffing
66%	$62m	Yard sampling and cleanup	Contracts to sample yards and clean up soils >100 ppm arsenic
12%	$11m	Soil Safety Program	Contracts to sample play areas and clean up soils over 20 ppm arsenic
5%	$5m	Cleanup staff	Five Ecology staff to manage contracts, field work, and cleanup data
11%	$10m	Local health department outreach	Interagency agreements fund outreach programs in King, Pierce, and Thurston counties
3%	$3m	Outreach staff and services	Mass media advertising, surveys, home soil testing program, and 1 FTE
1%	$1m	Technical assistance	1 Ecology staff technical assistance coordinator
2%	$2m	Administrative	Equipment, staff training, and 1 FTE

Settlement Spending Priorities

Protection of public health depends on preserving the full settlement

Once yard cleanups start, spending will begin to ramp up toward a peak of around $21 million in the 2015-2017 biennium (bar chart).

Ecology has already invested in designing the yard cleanup program, planning several large park cleanups, and building outreach programs.



Tacoma Smelter Plume 10-year project costs

The majority of funding goes directly to sampling and cleanup contracts

More than three-quarters of the settlement will go to soil sampling and remediation contracts.

We expect to sample over 10,000 properties and up to 2,000 of those could need cleanup. At the program's peak, we will have at least three separate cleanup contracts, each with multiple work crews.

A focus on soil cleanup protects those at greatest risk

A two-pronged cleanup approach addresses both geographic areas and populations at greatest risk.

The **yard cleanup program** will begin in neighborhoods with the highest estimated arsenic levels. At the same time, the **Soil Safety Program** reduces the potential for exposure in the places where large numbers of children regularly spend time.

Children's developing bodies are more susceptible to toxins, they spend time near the ground, and they often put dirty hands in their mouths

Partnering with local agencies stretches our dollars

We plan to provide $10 million over 10 years to local health departments to run "Dirt Alert" outreach programs and to support the overall project. These programs help people understand and reduce their exposure to soils that may be contaminated.

Local agencies know their communities best and are a trusted resource. They have health education expertise and the tools to evaluate and improve outreach programs. They also partner with other environmental health programs to promote Dirt Alert messages.

Soil Safety Program

Protecting children where they play

The Soil Safety Program provides free soil sampling and cleanup for child play areas. Created through 2005 legislation, the program has cleaned up over 100 play areas and sampled more than 1,000.

A new focus on park cleanup work

The program initially covered only schools and childcares. In 2010, the Asarco settlement allowed us to expand it and cover park, camp, and multi-family public housing play areas.

We found 32 parks needing soil cleanup and have completed eight cleanups (table). This fall, we cleaned up parks in Burien, SeaTac, Federal Way, and Vashon-Maury Island.

Soil safety is now a requirement of childcare licensure

The Department of Early Learning requires child-cares in the area to grant access to Ecology for soil sampling before they can become licensed. Settlement funds allowed Ecology to continue free soil sampling and cleanup for new childcares. This arrangement protects children without burdening care providers with the added cost.

Soil Safety Program Work from 2006 through September 30, 2012

Play area type	Assessed	Sampled	Action needed	Action taken
School	220	182	26	24
Childcare	875	744	86	83
Park	189	160	32	8
Camp	4	2	2	0
Multi-family public housing	11	4	0	0

Ecology first assesses play areas for exposed soil to sample. If arsenic or lead levels are over the action levels (below), Ecology removes or covers the soil.

Soil Safety Program Action Levels

Ecology takes action if:

- Average **arsenic** is over 20 parts per million (ppm) or any single sample is over 40 ppm; or
- Average **lead** is over 250 ppm or any single sample is over 500 ppm.

Stretching Public Funds by Combining Park Cleanup With Renovations

Titlow Park in Tacoma

When Ecology began planning for park cleanups, Tacoma Metro Parks was already in the middle of an $84 million park improvement effort.

At Titlow Park, the two agencies worked together to schedule cleanup around construction work. We saved time and money by removing contaminated soils before new facilities were installed.

Moving soils at Titlow Park in Tacoma

Soil Safety Program Results Map

This map shows schools, childcares, parks, and other facilities with play areas addressed through the Soil Safety Program.

Most play areas do not have elevated arsenic or lead (green). They are more likely to have elevated levels closer to the former smelter.

Most areas needing cleanup are complete (blue).

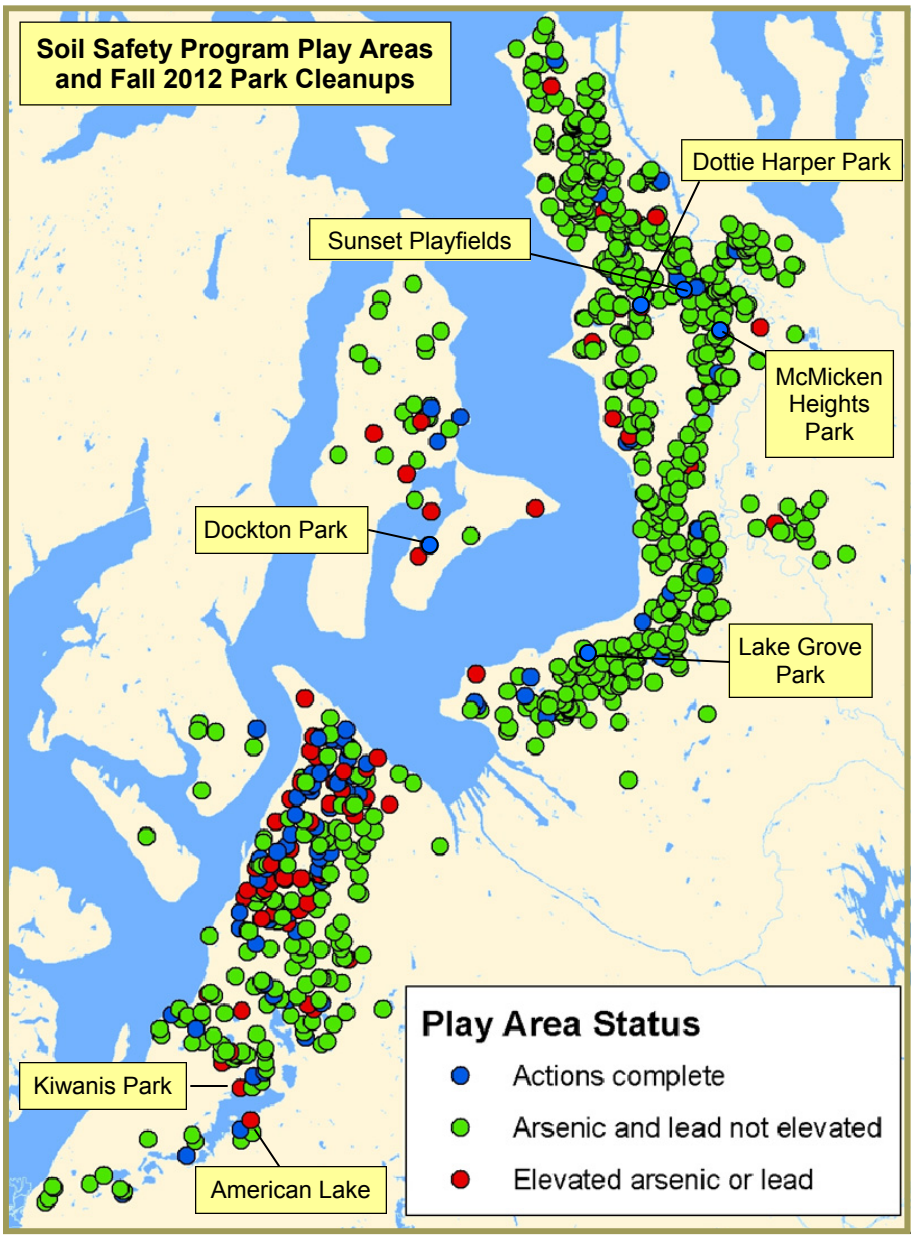
Seven park cleanups in Fall 2012

The parks highlighted on the map were part of the fall 2012 round of cleanups. Kiwanis and American Lake have work remaining for 2013.

Work remains at some play areas

Most of the remaining clean-ups (red) are at parks. In some cases, we are waiting to coordinate with a planned park construction project.

We also try to avoid impacting summer activities, and ensure sports teams and other groups have access to alternative playfields.



Using Cleanup as an Outreach Opportunity

Before cleaning up **Lake Grove Park in Federal Way** (shown here), Ecology did outreach to the neighborhood. We sent fliers to neighbors and held an open house on a warm August evening.

We let people know how to reduce contact with soil. Some residents signed up for free home soil testing to find out if their yards were affected.

Outreach Programs

Dirt Alert! program raises awareness and promotes behavior change

The main goals of outreach are to raise awareness about arsenic and lead contamination and educate the public about reducing soil contact.

The Dirt Alert program promotes “healthy actions” through nail brushes, posters, door hangers, and brochures. Healthy actions include:

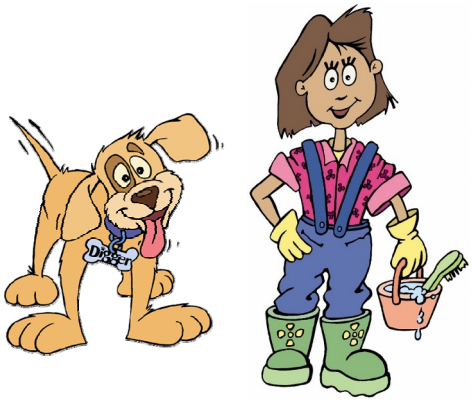
- Washing hands after playing or working outside.
- Taking off shoes at the door or using a doormat.
- Vacuuming and damp-dusting regularly.
- Covering bare patches of dirt in the yard.

Parents and childcare providers say fish nail-brushes encourage children to wash their hands.

Children and the adults that care for them are priorities for outreach

Arsenic and lead pose a larger risk for young children than for adults. Local health departments developed a wide range of outreach tools to target children, parents, teachers, and childcare providers. Strategies include:

- Training for childcare providers, for which they receive continuing education credits towards relicensing.
- Classroom presentations using the Dirt Alert curriculum.
- Home visits to do soil testing and outreach about reducing exposure.



Digger the Dog and Sudsy Sally are ambassadors of the Dirt Alert program.

Home soil testing is a way to educate residents about protecting their families

Pierce and King county residents can sign up for free home soil testing to find out if their soil is contaminated. More importantly, health department staff can educate them about simple ways to reduce contact with soil while enjoying their yard.

“We live in Lakewood, and have a toddler son and an 8 month old golden retriever... thank you for taking the time to test our soil. Since the soil test, before entering our home from the outside we all now take our shoes off, and wipe paws.”

Local health department partners

Ecology provides outreach funding to:

- Tacoma-Pierce County Health Department.
- Public Health—Seattle & King County.
- Thurston County Department of Health and Social Services.

After over a year off, Public Health—Seattle & King County is restarting its Dirt Alert program. A major goal is to **reach underserved populations** by asking communities for input in designing outreach programs.

Vashon Island farmer workshop addresses local concerns about food safety

This summer, Ecology held a workshop on Vashon. We showed a small group of farmers and gardeners how to cost-effectively sample a large acreage, and answered questions about reducing risk from contaminated soils.

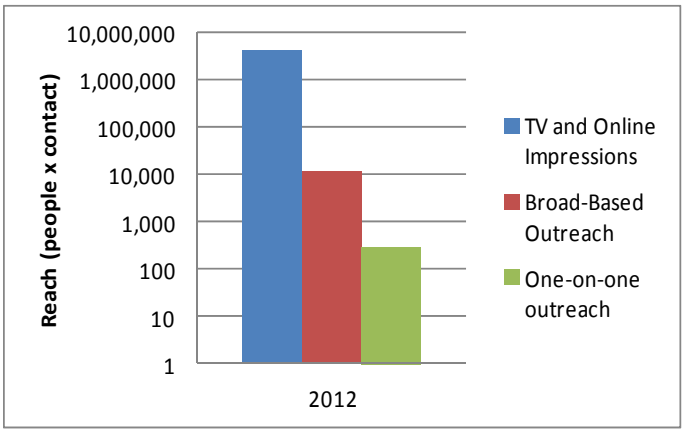
In return, the participants shared their local knowledge. This feedback will help us provide outreach to more people who grow food within the plume.

Dirt Alert has a wide reach while providing one-on-one assistance

We track how many times we reach a person with Dirt Alert messages. It can take many contacts and different methods to increase awareness and lead to behavior change. In the chart…

- Impressions are the number of times an ad runs, multiplied by viewership.
- Broad-based outreach includes mailers, trainings, and events.
- One-on-one outreach includes home visits, soil testing, and phone calls.

Community surveys show that more intensive, personalized outreach better empowers people to take action to protect themselves.



Dirt Alert outreach statistics January—September, 2012

Surveys and focus groups help shape outreach methods

Ecology and local health departments have used mail and phone surveys to gauge public awareness and measure behavior change.

In general, neighborhoods receiving more outreach tend to have higher levels of awareness. Behavior change is harder to measure. Many factors can influence actions like hand-washing and taking off shoes.

Tacoma-Pierce County Health Department used focus groups to design a gardening brochure and create a culturally-sensitive outreach campaign for the Slavic community in Tacoma.

Advertising technology reaches a wider audience with in-depth information

Comcast used the Dirt Alert program to test its new "Request for Information" feature. When the ad ran, customers could click their remote to request a brochure.

Over the 13 week campaign, we had 2,174 requests for mailers.

In **King County**, over 40% of requests came from apartments, representing an under-served population that Dirt Alert has had difficulty reaching in the past.

Residential Yard Cleanup Program

Work begins on designing a yard sampling and cleanup program

This program will provide free soil sampling for over 10,000 residential yards. Ecology will offer free soil cleanup for portions of yards with levels above:

- 100 parts per million (ppm) for arsenic; or
- 500 ppm for lead.

The map shows an initial estimate of areas that could have arsenic over 100 ppm—the "high zone." We are developing a new map of predicted arsenic values to refine the program service area boundary.

Cleanup priorities are based on risk

Cleanup will begin in Ruston and north Tacoma, where the highest contamination remains. Although this area was part of the Asarco Superfund cleanup, many yards still have over 100 ppm arsenic. The next priority is southern Vashon-Maury Island.

Next steps include public review

A draft program design will be ready for public comment in early 2013. Later in 2013, Ecology will pilot the cleanup program with a small group of homes in the Ruston area.

Tacoma Smelter Plume and an estimate of where soils could have over 100 parts per million (ppm) arsenic

Leveraging Yard Restorations to Achieve Other Environmental Benefits

Cleanup is a good time to improve landscaping to reduce water use, runoff, and pesticide and fertilizer use. Once a yard is dug up, it is easier to install a rain garden or replace sod with native or drought-tolerant plants.

Ecology is working with the City of Tacoma, Pierce Conservation District, Stewardship Partners, the Washington State University Extension, and the Tacoma-Pierce County Health Department.

We plan to pilot a "green cleanup" program with a small group of homes in 2013.

Rain garden, courtesy of WSU Extension

Technical Assistance Program

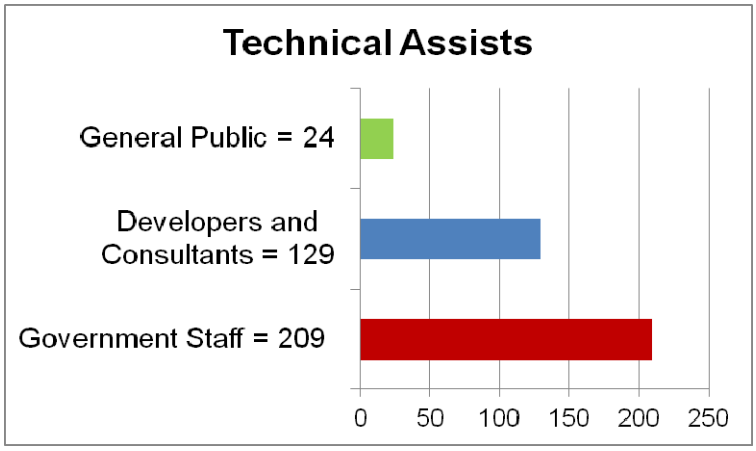
Encouraging soil cleanup during grading projects

Grading during land development is a good time to do cleanup because soils are already being moved. It is easier to dig them up or cover them before a development is built.

Our Technical Assistance Coordinator works with local governments, developers, and landowners to clean up contaminated soil.

We are partnering with 18 local permitting offices in King, Pierce, and Thurston counties to encourage landowners to do soil cleanup during grading. This resulted in a total of **15.1 acres** being cleaned up on several properties.

We presented to 18 groups, educating 201 government staff about the Tacoma Smelter Plume.



Tacoma Smelter Plume technical assistance provided January-September, 2012

Two Tacoma Developments Complete Cleanup and Protect Future Residents

StoneRidge at the Park Retirement Community

This new development in north Tacoma includes 64 duplex units, a rental office, park and picnic areas, a walking trail, and a path with two putting greens.

Before developing the site, owner Norpoint Communities removed contaminated soil from a 7.8-acre area. Over 22,000 cubic yards of contaminated soil went into a cell on the property. They then covered the soil with a liner, a drainage layer, and up to 11 feet of clean soil.

Laying a liner over the contaminated soil cell at StoneRidge

Highland Hills Golf Course New Residential Lots

Owners of the Highland Hills Golf Course in Tacoma removed contaminated soil from four newly created residential lots. The single family lots ranged in size from 4,995 to 6,352 square feet. They removed over 1,500 cubic yards of contaminated soil from the lots and disposed of it at the City of Tacoma landfill.

Excavating a new residential lot at Highland Hills

Ruston/North Tacoma Superfund Area

Coordinating with the Environmental Protection Agency (EPA)

The one square mile around the former Asarco smelter is a federal Superfund site. Since 1993, EPA has overseen the cleanup of thousands of neighborhood yards, and the smelter property itself.

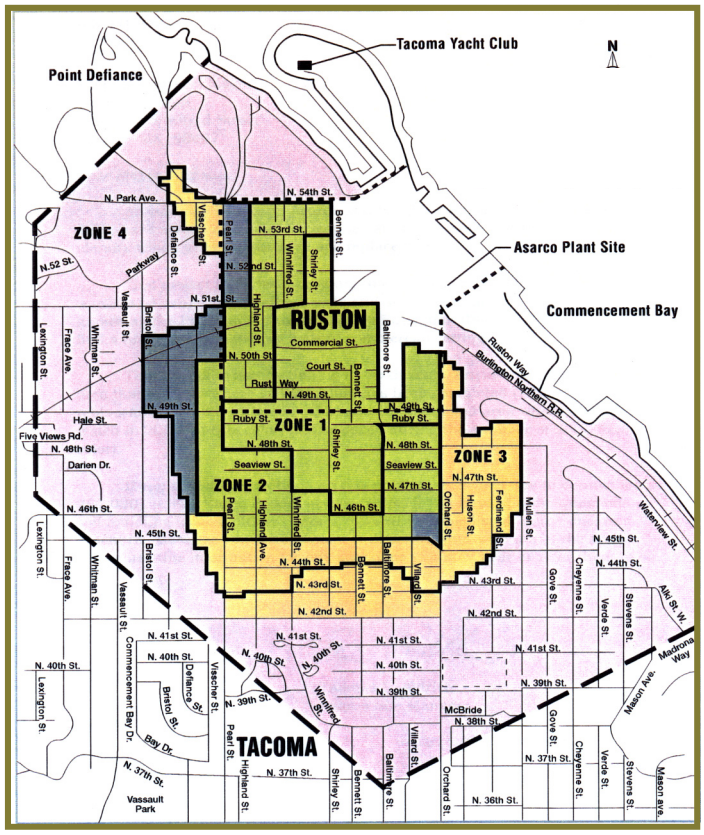
In 2013, Ecology will begin cleaning up yards that did not qualify for Superfund cleanup. Remaining contamination poses a significant risk to residents.

Ecology and the Tacoma-Pierce County Health Department will also take over outreach work in the community. We are coordinating with EPA to make this a smooth transition.

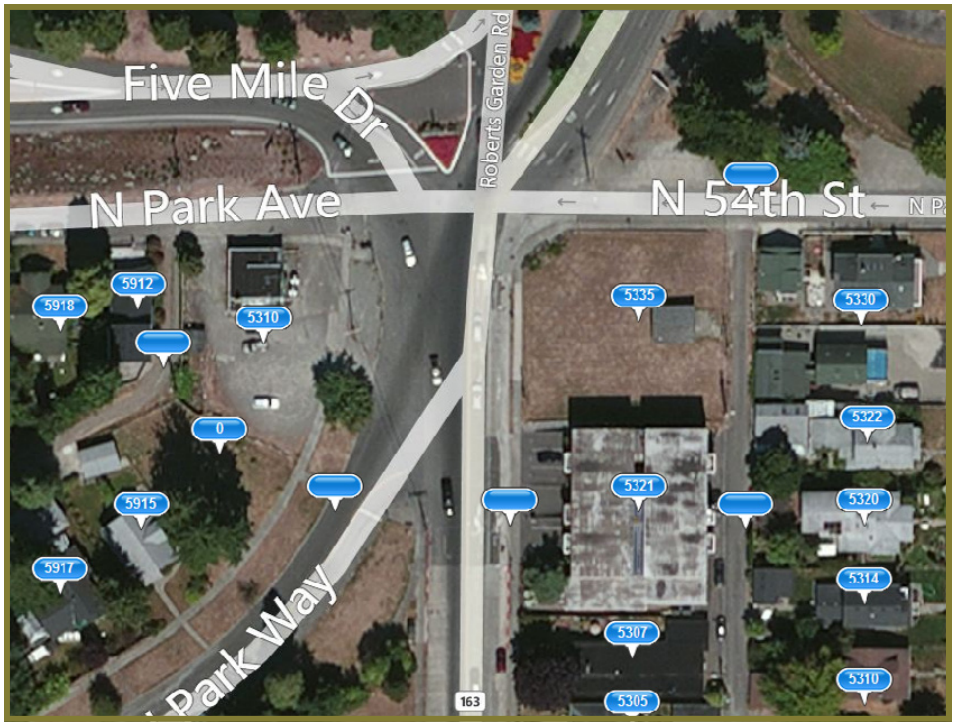
The Areawide Remediation Environmental Information System (AREIS)

Ecology is now managing soil sampling and cleanup data for the Superfund area through an online database. Residents can do a simple online search to find out if their yards were part of the Superfund cleanup.

Starting in 2013, Ecology will load more sampling and cleanup information from play areas and yards throughout the Tacoma Smelter Plume.



Ruston/North Tacoma Superfund area: Cleanup began in Zone 1 and move outward to Zone 4.



AREIS database map search: Users can type in a street address or parcel number to bring up a map.

Clicking on a bubble brings up a text box with links to sampling and cleanup results.

Tacoma Smelter Plume Team Members

Toxics Cleanup Program Management

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Ecology Project Staff

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Hannah Aoyagi, Project Planner

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John Zinza, Field Coordinator

Local Health Department Partners

Tacoma-Pierce County Health Department

Public Health—Seattle & King County

Thurston County Department of Health and Social Services

Tacoma Smelter Plume Information

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