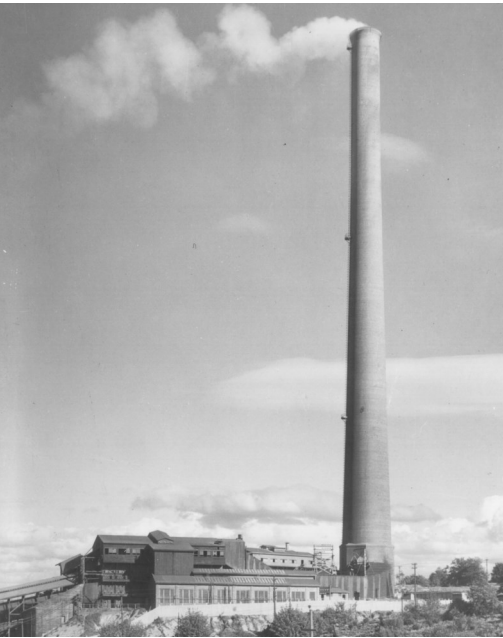


# Tacoma Smelter Plume

## 2015 Annual Report





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# Purpose of the Report

This report describes how the Department of Ecology (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 2015 performance measures.

Most of the report data are from October 1, 2014 through September 30, 2015.

# 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 soil in the Puget Sound region.



## The 2009 Asarco Bankruptcy Settlement

### Washington becomes part of the nation's largest environmental settlement

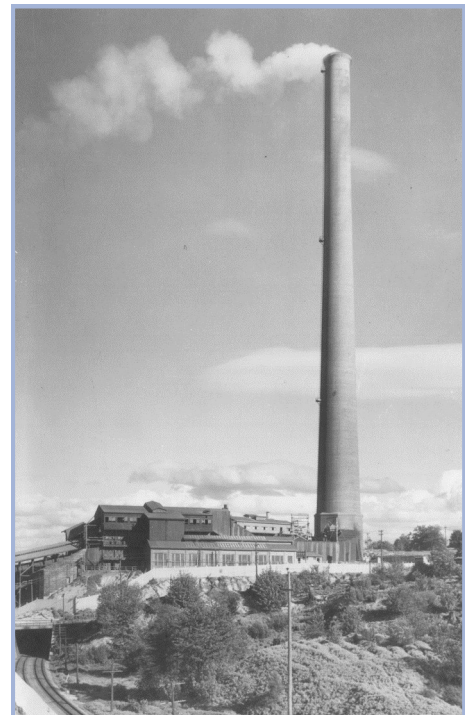
In 2005, Asarco declared bankruptcy, largely due to environmental liabilities from its nearly 100 cleanup sites across the country. The State of Washington joined the federal government and other states in a suit against Asarco that spanned four years.

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

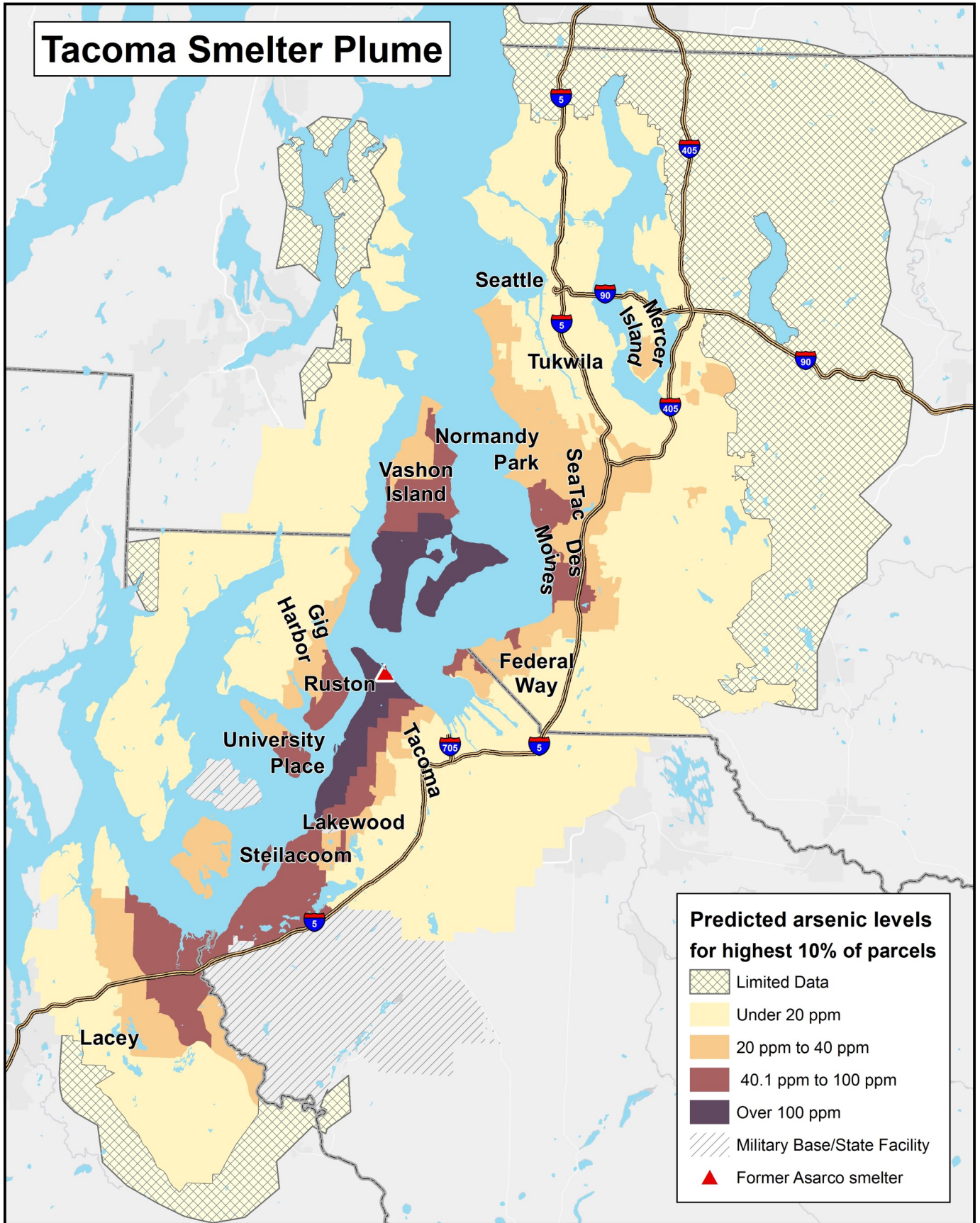
Asarco settled for \$94.6 million for the future costs of cleaning up the Tacoma Smelter Plume. It covers cleanup for play areas and residential yards, ongoing education and outreach, and technical assistance for those voluntarily cleaning up their own properties.

Most funds will go to replacing soil in yards in Ruston, north and west Tacoma, and southern Vashon-Maury Island neighborhoods, which have the highest contamination. See pages 4-5 for more about planned settlement spending.










*Historic photos courtesy of Tacoma Public Library Image Archives*

# Tacoma Smelter Plume



**Predicted arsenic levels for highest 10% of parcels**

-  Limited Data
-  Under 20 ppm
-  20 ppm to 40 ppm
-  40.1 ppm to 100 ppm
-  Over 100 ppm
-  Military Base/State Facility
-  Former Asarco smelter

With 90% certainty, at least 1 in 10 parcels will have arsenic in soil at or above levels shown. Predictions are based on distance and direction from the former Asarco smelter, and on sampling data from forested and other soils undisturbed by development. Actual arsenic levels may vary greatly from parcel to parcel. Arsenic levels are shown in parts per million (ppm).

# 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

## 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 a 1,000-square-mile area—the Tacoma Smelter Plume (plume).

Arsenic and lead can harm your health. Within the plume, hundreds of thousands of people may be exposed by accidentally ingesting or inhaling contaminated soil. Children are at highest risk because they put dirty hands and toys in their mouths, and because their bodies are still growing and developing.



**Former Asarco smelter and its 571-foot smokestack**

## Understanding patterns of contamination helps to prioritize cleanup work

The Tacoma smelter used high-arsenic ores. Its 571-foot smokestack was believed to be the tallest in the world when it was built. These factors, along with 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 sampling and replacing soil 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 caretakers, in particular.

In 2005, the Area-Wide Soil Contamination law (Chapter 70.140 RCW) led Ecology to develop the Soil Safety Program. At first, the program provided free soil sampling and replacement 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.

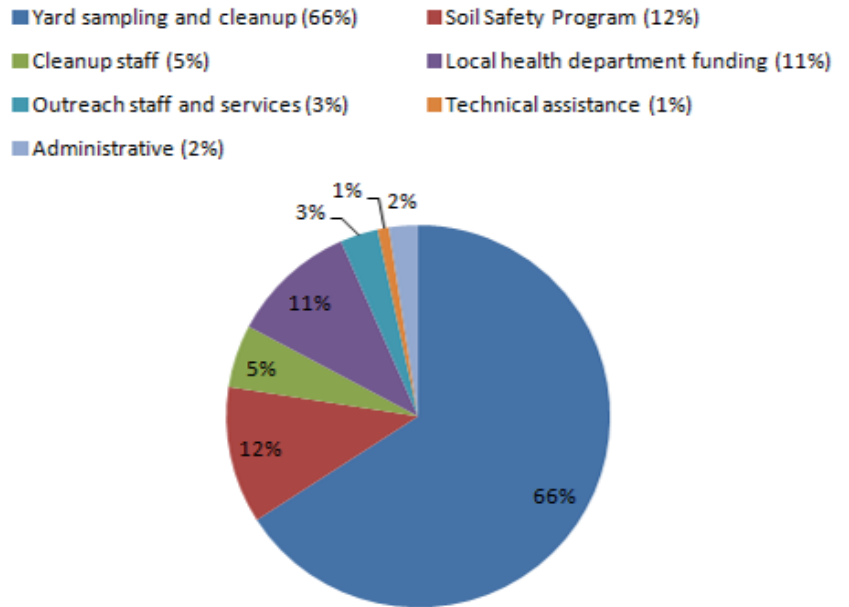
## Ten-Year Plan for Managing the Tacoma Smelter Plume

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:** Sample and replace soil from existing residential yards in areas of highest contamination.
- **Soil Safety Program:** Continue sampling and replacing soil in child play areas at schools, childcares, parks, and camps.
- **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 the Tacoma Smelter Plume settlement funds (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 replace soil over 100 ppm arsenic
12%	\$11m Soil Safety Program	Contracts to sample play areas and replace soil over 20 ppm arsenic
5%	\$5m Cleanup staff	Six 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 staff person
1%	\$1m Technical assistance	1 Ecology staff technical assistance coordinator
2%	\$2m Administrative	Equipment, staff training, and 1 staff person



## Cleanup and Risk Management Priorities: Settlement Funds Support Efforts to Protect Human Health

### Biggest year yet for soil replacement in the Tacoma Smelter Plume

The \$62 million Yard Sampling and Cleanup Program is under way, with over 1,000 yards already slated for soil cleanup, also known as soil replacement. By the end of 2015, over 150 of those yards will be complete.

Soil replacement on Baltimore and Optimist Parks is nearly complete. Plans are in progress for soil replacement in a park play area at Fort Nisqually in Point Defiance Park in early 2016.

### Soil Sampling is more than half way complete in Tacoma area

In Tacoma, we have offered sampling to 3,115 homeowners. So far, we have sampled 1,919 yards in Tacoma to determine if they qualify for soil replacement. We plan to start sampling multi-family residential properties in 2016. Our goal is to finish sampling by June 2017.

### The demand for education programs continues to grow

Soil replacement and sampling of yards increases awareness of the risks of arsenic and lead. Sampling programs continue to identify more and more homes with elevated arsenic levels that don't qualify for soil replacement. As a result, we have created new outreach tools to promote healthy actions for those at risk.

Local interest groups are requesting information about the risks of arsenic and lead, including gardeners, landscapers and pet owners. Ecology and local health departments continue to develop strategies to promote healthy actions.

### Ecology meets with local permitting offices to discuss cleanup during development

Development is a good time to test for and address soil contamination. Our free advice can help offset some of the cost. This summer, Ecology staff met with local permitting offices within the plume to brainstorm new ways to provide outreach for developers.



Our sampling programs have identified over 1,000 yards that qualify for soil cleanup. We expect to find at least 160 more over the next year.



The Tacoma-Pierce County Health Department presents information on healthy actions at a gardening workshop.

## Yard Sampling & Cleanup Program

### Removing contaminated soil protects people now and into the future

The Residential Yard Sampling and Cleanup Program (Yard Program) provides free soil sampling for the 5,022 yards in the service areas shown to the right.

Ecology is offering free cleanup, also known as soil replacement, for portions of yards with levels over:

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

### Soil sampling continues in Tacoma and Vashon Island

In **Tacoma**, the Tacoma-Pierce County Health Department (TPCHD) has offered sampling to 3,115 homeowners. Of those, 2,109 agreed to sampling and they completed sampling for 1,922 yards. Over the next two years, TPCHD will offer sampling to the remaining homeowners in the area.

On **Vashon Island**, we offered sampling to 807 yards in the service area. A total of 639 homeowners agreed to sampling and we completed sampling for 615. Last year we extended the service area on Vashon-Maury Island to include 232 more properties. We will continue to accept sign ups and offer sampling through the summer of 2016.

As of September 30, 2015, we signed up 2,748 homeowners and **sampled 2,537 yards** throughout the service area. See the table below for more progress measures.

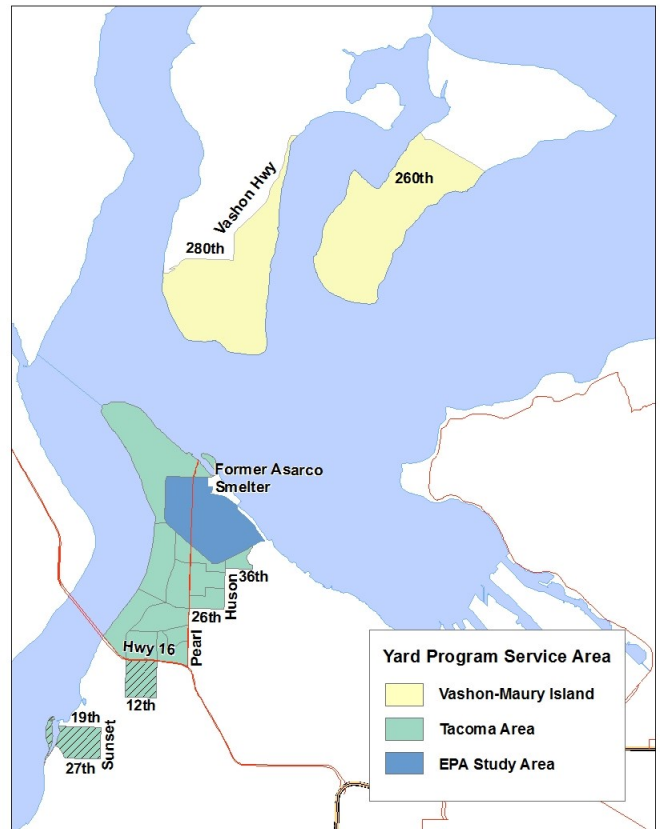
### Soil sampling identified 341 more yards that qualify for soil replacement

In **Tacoma**, we found 297 more yards that qualify for replacement outside the EPA Study Area (see map above).

On **Vashon Island**, we found 44 yards that qualify.

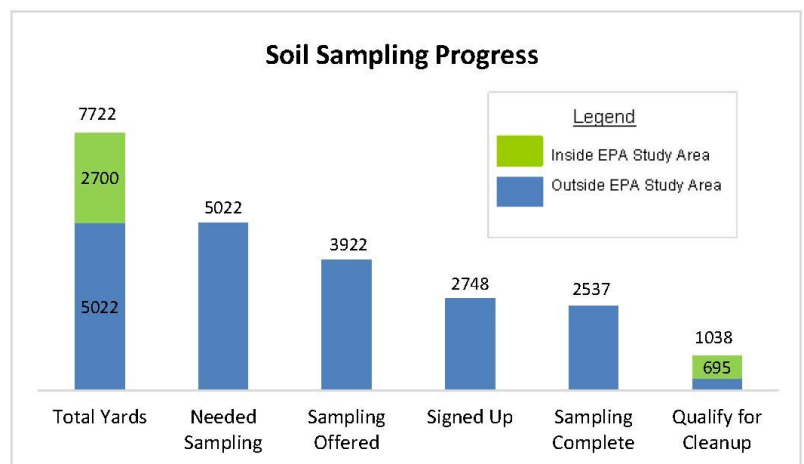
In the **EPA Study Area**, around 695 yards qualify. These yards were sampled during the EPA Superfund Cleanup in the 1990's and early 2000's.

Overall, there are **1,038** yards slated for soil replacement in the program. We estimate that we will find at least 160 more yards that qualify for soil replacement.



### Yard Sampling and Cleanup Program Service Area

Cleanup is in its second year in the EPA Study Area. Soil sampling began on Vashon and just outside of the EPA Study Area in the summer of 2013. The service area for Vashon-Maury Island was extended in 2015 to include 232 additional yards.



### Yard Program soil sampling progress as of Sept. 30, 2015.

Total yards includes the 5,022 that needed sampling plus 2,700 EPA Study Area yards already sampled by the EPA. The 1,038 total yards that qualify for cleanup include 341 outside the EPA Study Area and 695 within the EPA Study Area.

**Construction underway on 90 yards in 2015.**

In August 2015, we started replacing soil on 90 yards. In Tacoma, we began work on 75 yards. On Vashon Island, we began work on 15 yards. This work will continue through the late fall and early winter.

Since 2013, we have replaced soil on a total of 55 yards in Tacoma and six yards on Vashon Island. In 2016, we will continue to work primarily in the EPA Study Area. In 2017, we plan to expand our work outside of the EPA Study Area in Tacoma (see map to the left).

**More than 100 yards slated for soil replacement in 2016 construction season**

In 2015, we met with homeowners to discuss soil replacement and re-landscaping plans. We plan to replace soil for at least 100 of those yards in 2016.

**EPA-funded soil replacement on 19 yards**

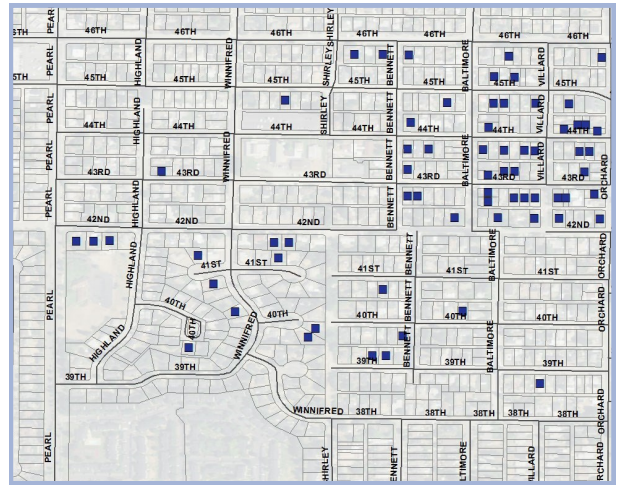
Sampling has identified 19 yards with arsenic over 230 parts per million, the action level of the Environmental Protection Agency (EPA). We have an agreement with the EPA that they will fund the soil replacement for these yards. We completed work on 8 yards in 2015 and plan to work on 11 yards in 2016.

**Increased outreach about the Yard Sampling and Cleanup Program**

In 2015, we offered more opportunities for the public to learn about the program. These included:

- General public meeting in Tacoma to present details of the cleanup work and answer questions.
- Orientation meetings for residents receiving soil replacement.
- Project line to call for concerns about a cleanup site or to find more information.
- Banner and fact sheet posted for each 2015 cleanup group.
- Social media including blog posts, emails to our Listserv and updates to our website.

This fall and winter we will continue to develop and expand our education and outreach tools for those residents not receiving soil replacement.



Some of the yards receiving cleanup in 2015. In August 2015, Ecology began work on 75 yards in North Tacoma for the 2015 cleanup season.



In most cases, we remove the top 12-18 inches of soil, then backfill and re-landscape the yard.



Near our active cleanup sites, we posted a banner with our project line and website.

## Education and Outreach Programs

### Dirt Alert! programs raise awareness and promote behavior change

The main goals of Dirt Alert programs are to:

- Raise awareness about the risks from arsenic and lead soil contamination.
- Educate the public about reducing soil contact.
- Encourage taking healthy actions to manage risk.

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.

Dirt Alert encourages healthy actions through one-on-one planning conversations, nail brushes, posters, damp dust cloths, door hangers, and brochures.

### 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. These include:

- Training childcare providers, who receive continuing education credits towards relicensing.
- Classroom and library presentations.
- Home visits to do soil testing and education about reducing exposure.
- One-on-one conversations to help people plan how to work with their families to take healthy actions.



Healthy actions, such as washing hands after playing or working outside, can reduce exposure to contaminants in soil.



Local health departments provide outreach at fairs and festivals for children and adults.

### Home soil testing programs have educated thousands of families

Pierce and King county residents can sign up for free home soil testing for the areas of their yard that they use the most. Health departments use this as a chance to teach them about simple ways to reduce contact with soil while still enjoying their yard.

*"The information the testing provided enables us to make healthy decisions for our kids, especially considering lead and arsenic risks." (Pierce County resident)*

*Testing takes less than an hour. Samplers dig small holes, remove the soil, and send it to a lab.*



### Local health department partners

Ecology provides outreach and education funding to:

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

Health departments do home soil testing, one-on-one outreach, give presentations to adults and children, outreach at events, work with community groups, help develop materials, and outreach to gardeners, landscapers, and non-English speakers.

### Dirt Alert in-depth outreach increased from 2014 to 2015

We track how many people we reached 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 and events.
- One-on-one outreach includes home visits, soil testing, and phone calls.
- Work with community groups includes trainings and community grants.

In 2015, we continued to increase work with community groups and one-on-one outreach. We also contacted thousands of households about the Yard Program (pages 6-7).

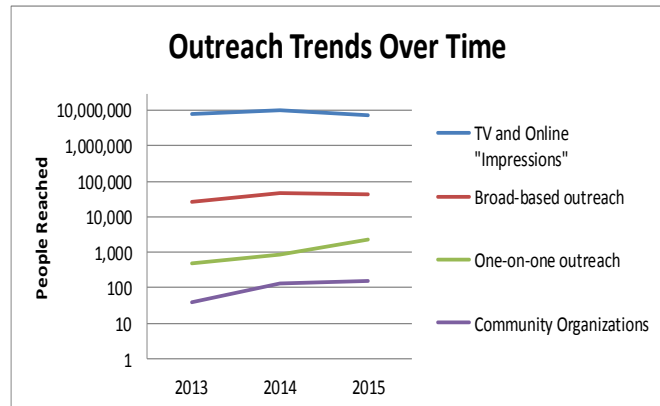
Tacoma-Pierce County Health Department has increased outreach by developing a new general website, DirtAlert.info. This website covers the entire plume area and connects to all resources and programs.

### Increased work with ethnic groups builds community knowledge and resources

In 2015, the Public Health—Seattle & King County gave grants to three community based organizations. Latino Community Fund and the Korean Women’s Association are increasing outreach to Spanish and Korean communities. Child Care Resources is training childcare providers and developing materials for specific outreach in Somali.



Local health departments give presentations on gardening in arsenic and lead contaminated soil.



Dirt Alert outreach statistics for October 1st, 2012 to September 30th, 2015.



Korean Women’s Association gives a workshop on Dirt Alert education.

## Soil Safety Program

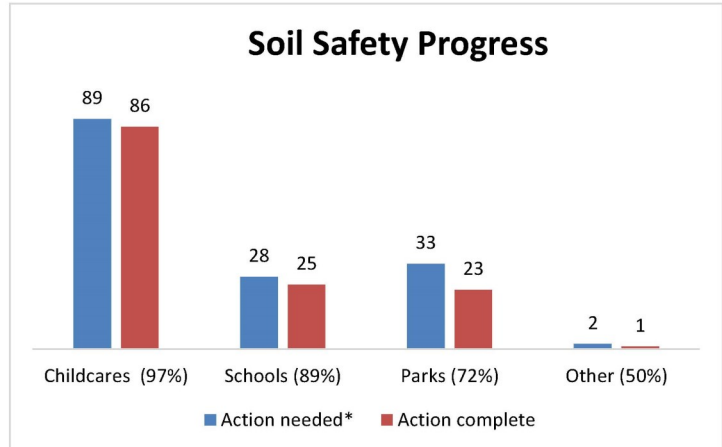
### Protecting children where they play

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

### Ecology continues work to replace soil in play areas at parks

In 2015, we replaced soil at Baltimore and Optimist parks in Tacoma. Of the 33 contaminated parks in the program, only 10 are left on our cleanup list. The rest have either had soil replacement or signage installed where risks are low.

In 2016, we will replace soil at Fort Nisqually play area at Point Defiance Park. We are also negotiating an interagency agreement with the City of Des Moines to replace soil at Parkside Park.



**Soil Safety actions since 2006.** Ecology assesses play areas for exposed soil to sample. If arsenic or lead are over the action levels (see page 12), we take actions to remove or cover the soil.

*\*Includes some facilities that have since closed.*

## Baltimore and Optimist Parks: Park cleanup continues in Tacoma

This August, Ecology started construction to replace contaminated soil at two Tacoma neighborhood parks:

- Baltimore Park - 4716 N. Baltimore Street
- Optimist Park - 1330 N. James Street.

We started excavation at Baltimore Park (top picture) and then filled in clean soil. Next, we moved onto Optimist Park. In late October, we will drill seed both park fields with grass at the same time.

Fences will remain up around the new grass until summer 2016. Grass roots need time to establish before visitors can start using the playfields again.

*Upper: Removing soils from Baltimore Park.*

*Lower: Contractors deliver clean soil to backfill the excavated areas at Optimist Park.*



## Technical Assistance Program

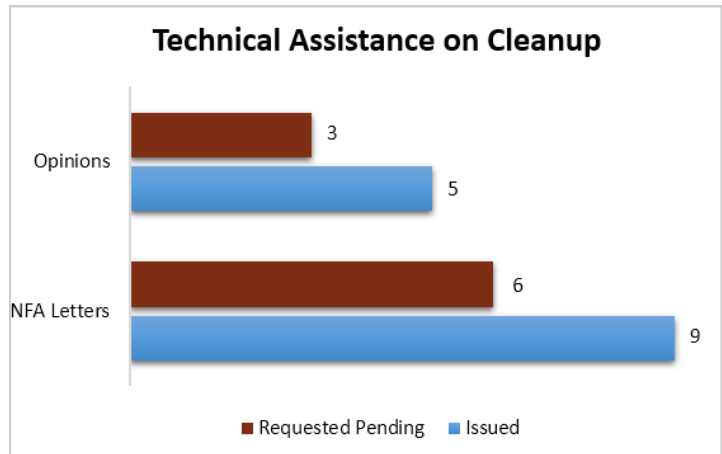
### Encouraging soil replacement during grading projects

Land development is a good time to test soil for contamination and complete soil replacement. During most grading activities soil is moved before development. It is easier and cost-effective to replace soil before constructing houses, buildings, and roads.

Our Technical Assistance Coordinator works with state and local governments, developers, and landowners to streamline the replacement of contaminated soil.

We partner with 18 local permitting offices in King, Pierce, and Thurston counties to encourage landowners and developers to replace soil during grading.

Between October 2014 and September 2015, landowners and developers cleaned up over **60 acres** of soil contaminated with arsenic and lead. These properties were cleaned up through the Voluntary Cleanup Program (VCP).



#### Technical Assistance on Cleanup in 2014-2015.

Ecology provides free technical advice on planned and completed cleanup. We issue a No Further Action (NFA) letter when the developer meets cleanup requirements. This opinion may help developers obtain necessary permits, loans or sell the property in the future.

### Meridian Campus: Integrating Cleanup into Development

Meridian Campus is a 1,540-acre single and multi-family development complex in Lacey, Thurston County.

The contamination level across the Meridian Campus development was low enough to allow mixing of the upper contaminated soil layer with cleaner lower soil.

To date, the contractor replaced soil in over 127 acres of soil contaminated with arsenic and lead in eight parcels within the Meridian Campus development before building homes and schools.

In the future, they plan to replace soil on additional parcels within the Meridian Campus through the VCP process.



Meridian Campus - Campus Springs received an NFA letter in the fall of 2014.

## Ruston/North Tacoma Superfund Area

### After Superfund cleanup, remaining contamination still poses a risk

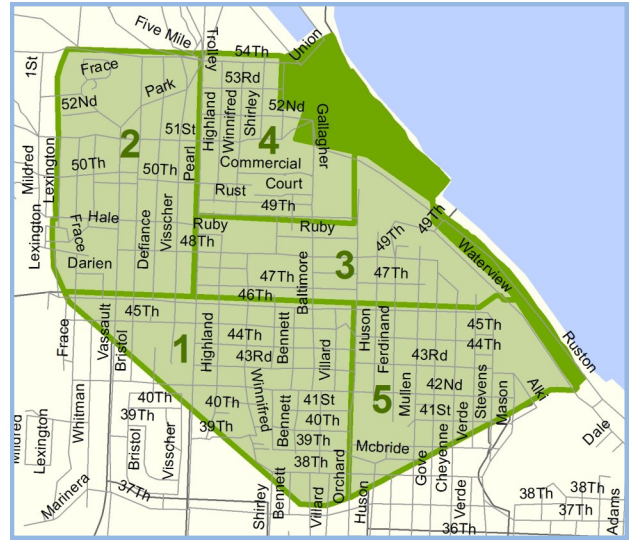
The one-mile radius around the former Asarco smelter is a federal Superfund site (map to right), managed by the US Environmental Protection Agency (EPA).

**Work completed by EPA:** From 1993 to 2012, EPA oversaw Asarco's work to sample 3,750 properties and cleanup 2,436.

**EPA action level:** Asarco only did cleanup where arsenic levels were over 230 parts per million (ppm).

**Remaining contamination:** Around 700 yards still have arsenic over Ecology's action level of 100 ppm. Many more are above the state cleanup level of 20 ppm (see chart below).

Ecology is using Asarco settlement funds to clean up the 700 next most contaminated yards.



**Ruston/North Tacoma Superfund area cleanup sequence.** Ecology started cleanup in area 1 because it has the highest percent of yards that still need cleanup.

### Ecology continues to find yards above the EPA action level

Through soil sampling programs, Ecology has found 19 yards with arsenic above 230 ppm. Some of these yards were found outside the EPA Study Area. Ecology is prioritizing these yards because of their level of contamination. We completed work on eight yards in 2015. Under an agreement with Ecology, EPA will reimburse the state for soil replacement on these yards.

### Local health department survey shows that additional outreach is needed for newer residents in the EPA Study Area

In 2014, the Tacoma-Pierce County Health Department and Ecology took over EPA's outreach work and began operating the Asarco Information Center. In October 2014, the health department mailed over 2,650 surveys to single family residences in the Study Area to assess awareness. The surveys showed that newer residents were less aware of the history of contamination on their property.

The health department hosted six meetings with the EPA Study Area advisory committee. The advisory committee is composed of representatives from schools, community groups, and businesses. This year, the committee provided input on outreach strategies and materials for the Study Area. This included strategies to inform new residents of the history of Asarco contamination in the area.



**Arsenic Cleanup Levels and Action Levels.** An action level is the point where an agency will take action to clean up the soil. Action levels depend on the agency doing the work and the type of area being cleaned up. Ecology requires soil used for soil replacement to meet the state cleanup level of 20 parts per million (ppm) arsenic.



## Other Work Supported by the Tacoma Smelter Plume Project

Ecology's staff provides oversight and technical assistance for other projects funded by appropriations from the Asarco settlement. These projects deal with soils impacted by the former Tacoma smelter.

Our role is to ensure contaminated soils are properly managed.

### Ruston Tunnel

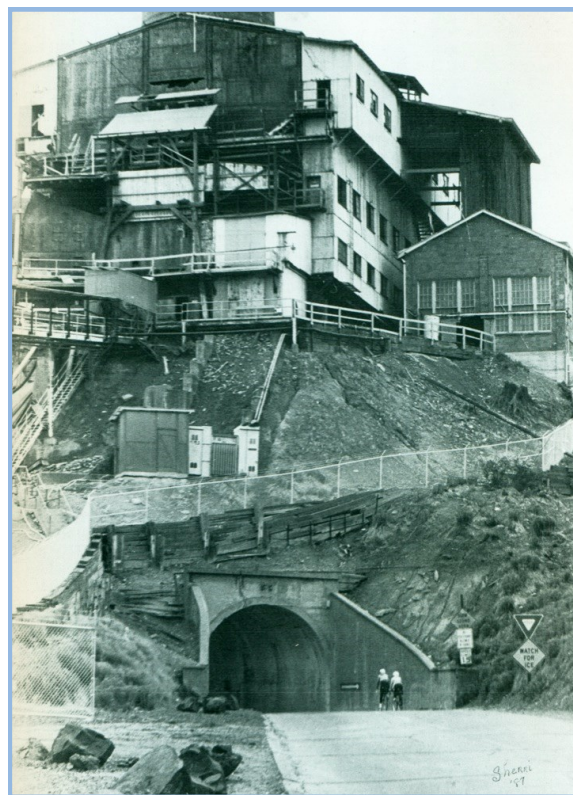
In the 2013-2015 biennium, the Legislature set aside \$400,000 of the Asarco settlement for the closure of the Ruston Tunnel. Ecology and the City of Ruston are negotiating an interagency agreement to complete this project.

The tunnel connected Ruston Way to Tacoma, under the former Asarco plant (photo to the right). Today, a new road goes around the tunnel. The old tunnel is now mostly filled with contaminated soils. The next step is to fill the remaining space to make it stable. The final step is to seal the tunnel.

### Point Defiance Trail

In 2013-2015, the Legislature also set aside \$5 million of the Asarco settlement for the Point Defiance Trails Project. The Trails Project completes a 7-mile destination waterfront trail connecting Ruston Way with Point Defiance Park.

In 2015, Ecology and Tacoma Metro Parks negotiated an interagency agreement and Metro Parks started construction. Part of the funding will go toward soil management during trail building.



**Ruston Tunnel under the former Asarco plant.** Photo courtesy of Sherri Forch.



**Point Defiance Trails Project**

## Tacoma Smelter Plume Team Members

### Toxics Cleanup Program Management

Jim Pendowski, Program Manager  
Rebecca S. Lawson, Southwest Region Section Manager

### Ecology Project Staff

Marian Abbett, Project Manager  
Jill Reitz, Project Planner  
Stacy Galleher, Outreach Coordinator  
Diana Smith, Outreach Coordinator  
Eva Barber, Technical Assistance Coordinator  
Amy Hargrove, Cleanup Manager

Jackson Barnes, Cleanup Coordinator  
Crescent Calimpong, Cleanup Outreach Coordinator  
Steve Needles, Cleanup Field Coordinator  
Shelby Giltner, Cleanup Field Coordinator  
Lisa Kean, Cleanup Administration

### 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

**Websites:** <http://www.ecy.wa.gov/toxics/tacoma-smelter.html> or <http://dirtalert.info>

**Contact:**

Marian Abbett, P.E.  
Southwest Region, Toxics Cleanup Program  
P.O. Box 47775  
Olympia, WA 98504-7775  
[Marian.Abbett@ecy.wa.gov](mailto:Marian.Abbett@ecy.wa.gov)  
360-407-6257

### Arsenic in Soils Database and Smelter Search Interactive Map

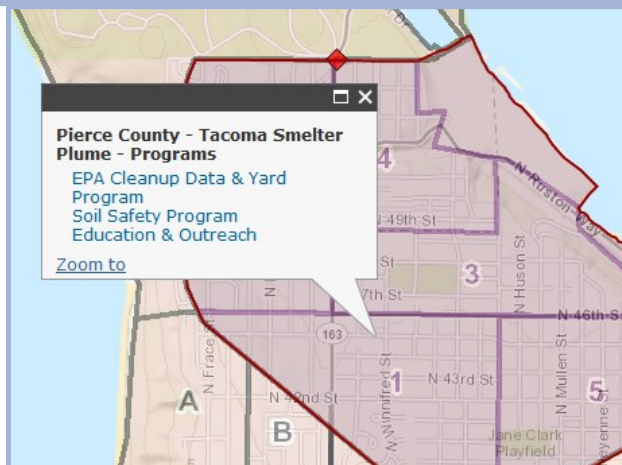
**Arsenic in Soils Database:** The public can find soil sampling and cleanup data through an online database. Data include past Superfund cleanups and sampling results from Ecology’s Yard Program (pages 6-7).

<https://fortress.wa.gov/ecy/areispublic/>

**Smelter Search:** This interactive map links users to programs they qualify for, including soil sampling and outreach.

<https://fortress.wa.gov/ecy/smeltersearch/>

*Smelter Search results for a north Tacoma address.*





**Washington State Department of Ecology**

Toxics Cleanup Program  
Southwest Regional Office  
P.O. Box 47775  
Olympia, WA 98504-7775

**To request ADA accommodation**, including materials in a format for the visually impaired, call Jill Reitz at 360-407-6245. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

**Tacoma Smelter Plume, Facility Site ID #89267963**