EPA 910/R-94-001

United States
Environmental Protection
Agency

Region 10
1200 Sixth Avenue
Seattle WA 98101

Alaska
Idaho
Oregon
Washington

Superfund

Revised March 1994

EPA

The Asarco Tacoma Smelter Superfund Projects:

A Brief Overview

How You Can Get Involved

The U.S. Environmental Protection Agency (EPA), the Washington State Department of Ecology, and other State and local agencies are working to protect public health and improve the environment in contaminated areas of Ruston and Tacoma, Washington. This updated brochure provides an overview of the various Superfund projects associated with the Asarco Tacoma Smelter.

EPA encourages Ruston and north Tacoma community members to become involved in the Asarco Superfund cleanup process by participating in community education and involvement programs. You can become involved in and learn more about the Asarco projects in the following ways:

☑ Attend Community Workgroup Meetings

All interested community members are welcome to attend community workgroup meetings. The meetings are held quarterly in the McCormick Public Library, 3722 N. 26th Street, Tacoma, Washington.

Established by EPA, the community workgroup is a forum for learning and expressing your ideas and opinions about the Asarco cleanup program. The workgroup is made up of community members and EPA staff working on the Asarco Superfund projects. If you would like to join the group, contact one of the EPA representatives listed in this brochure.

☑ Read EPA and Asarco Fact Sheets

EPA writes and distributes fact sheets for community members. The fact sheets offer up-to-date information about the Asarco cleanup activities and investigations. If you would like your name added to EPA's Fact Sheet mailing list, contact EPA Staff listed on the last page of this brochure.

Asarco publishes a residential soils bulletin which provides information on the Ruston/North Tacoma residential cleanup to residents, property owners, businesses and schools. New issues will be distributed as the project progresses and more information becomes available.

☑ Become Active in Other EPA Programs

You are welcome and encouraged to attend public information meetings, open houses, and workshops about the Asarco cleanup projects. You can find announcements of upcoming activities in local newspapers, fact sheets, and meeting notices mailed to community members. You can also find out about upcoming community involvement activities by contacting the EPA's Community Relations Coordinator in Seattle. Check the last page of this brochure for additional information.

Cover photo: Ed Kane, Freelance Graphics

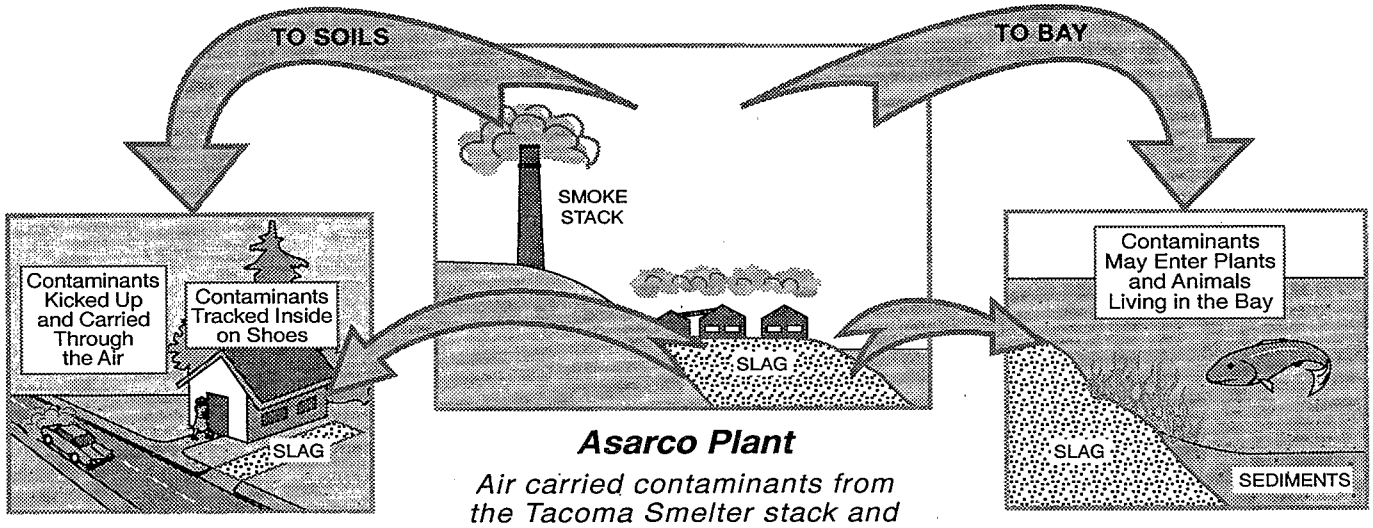
Historical Overview

The Asarco Tacoma Smelter is located on about 67 acres along the shore of Commencement Bay in Ruston and Tacoma, Washington. The facility is owned by ASARCO, Incorporated (Asarco). The smelter operated from 1890 until 1986, first as a lead smelter, and later as a copper smelter that processed ores containing high levels of arsenic. In 1985, smelting operations were discontinued, and in 1986, the facility closed permanently. During the time it operated, the Asarco Smelter used high temperature furnaces to melt the metals away from raw materials. This smelting process resulted in two main types of contaminant releases:

Sulfur Dioxide and Contaminated Dust - The smelter stack and other parts of the plant released sulfur dioxide (a gas) and dust particles (containing arsenic and other metals) into the air. Much of the dust settled onto the soil throughout Ruston and north Tacoma, and some fell into the waters of Commencement Bay. Most of the dust that fell on the land remains in the soil today. However, a portion of the contaminated soil has been and continues to be carried by wind and rainwater into Commencement Bay.

Slag - A hot, liquid residue called slag was a waste product of the smelting process. This slag contains lead, arsenic, copper, and other metals. Asarco poured hot slag into Commencement Bay to cool and harden, creating an artificial shoreline. Approximately two-thirds of the plant area at the smelter facility and the entire yacht club peninsula are slag. Some slag was also cooled on land, resulting in a black, rock-like material. This material was sold to residents and businesses in the community and used as ornamental rock, driveways, sandblast grit, fill, and a variety of other purposes.

How Contaminants From the Asarco Plant Spread to the Surrounding Community



Ruston/North Tacoma

Slag was used for driveways and ornamental rock.

Asarco Plant

Air carried contaminants from the Tacoma Smelter stack and process areas to soils and Commencement Bay.

Commencement Bay

Slag was placed in the Bay to cool and harden. Rainwater washed contaminated soils into the Bay.

The Asarco Tacoma Smelter Superfund Projects

In 1983, the area now known as the Commencement Bay Nearshore/Tideflats Site was added to EPA's list of Superfund sites. Three projects associated with the Asarco Smelter operations are being addressed as part of the overall Commencement Bay Nearshore/ Tideflats Superfund Site:

1. ***The Asarco Smelter Site and Marine Sediments***
2. ***Demolition of the Smelter Buildings***
3. ***The Ruston/North Tacoma Residential Soil Cleanup***

What is Superfund?

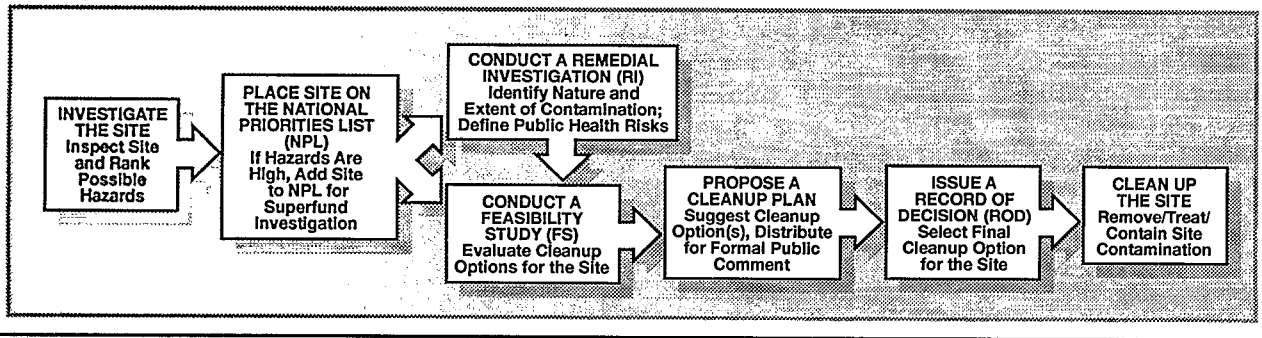
In 1980, Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA). These two laws, commonly known as Superfund, provide EPA with the authority and resources to investigate and clean up releases, or threatened releases, of hazardous substances.

Superfund authorizes EPA to take legal action to ensure that parties responsible for polluting soil or water clean up those areas. If the responsible parties do not or cannot clean up the sites, EPA can spend "Superfund" money to clean up the sites.

Once a site has been identified by EPA as needing attention under Superfund, it is placed on the National Priorities List (NPL). The site is then investigated and, if necessary, a cleanup program is implemented. If a site poses an immediate threat to public health or the environment, EPA has the authority under Superfund to address the situation quickly through a "removal action" that can occur before the overall site investigation is complete.

Every site addressed under the Superfund program is different, and cleanups are tailored to the specific conditions at each site. Cleanup usually involves treating, removing, or containing the hazardous wastes. Through the Superfund process (indicated in the chart below), EPA seeks permanent solutions to reduce the public's exposure to pollution and to prevent the spread of pollution in the environment. EPA publishes fact sheets and sponsors many educational activities, such as community meetings and workshops, to keep the public informed and involved in ongoing Superfund investigations and cleanup projects.

The Federal Superfund Process



1 The Asarco Smelter Site and Marine Sediments

As a result of past operations at the Asarco Smelter, the Asarco property contains slag, soil, surface water, groundwater, and buildings that are contaminated with metals (such as antimony, arsenic, cadmium, chromium, copper, lead, nickel, and zinc) and organic compounds (such as dimethylaniline).

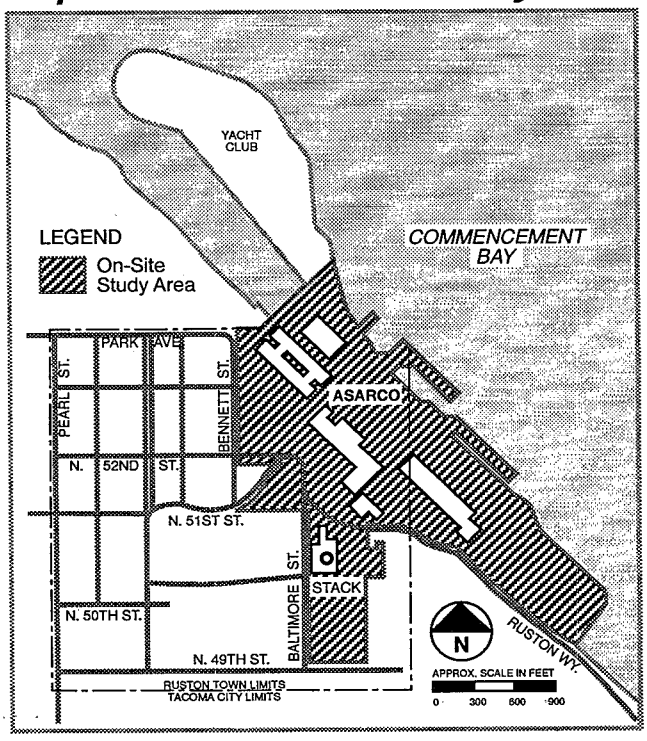
The metals and organics in the soil, slag, groundwater and surface water from the Asarco operations have also contaminated the sediments along the shoreline. Sediments are materials such as sand, soil, slag, mud, and decomposing plants and animals that have settled to the bottom of the Bay. EPA is concerned that marine organisms living both in the sediments and in the Bay are being adversely affected by the metals contamination. Also, people consuming contaminated fish or shellfish from this area may experience adverse health effects.

Historically EPA has evaluated the cleanup of the smelter facility and the off-shore sediments separately. Based on the results of these investigations, and after considering the viable cleanup options, EPA plans to integrate the smelter facility and slag peninsula cleanup activities with the cleanup for the off-shore sediments project.

Future land use will be considered by EPA in the cleanup decisions. EPA plans to clean up the contamination at the smelter facility, slag peninsula and off-shore sediments in two phases. The Phase I cleanup decision can be expected by September 1994. Phase I will include activities to control continuing sources of contamination. These types of "source control" activities will be designed to eliminate possible exposure to contamination, and therefore reduce site risks. Source control activities could include:

- capping, treating or excavating contaminated soil and slag
- abandoning production well
- surface water controls
- groundwater diversion
- institutional controls on certain property uses - a cap maintenance and monitoring program, and restrictions on the use of groundwater on the site

Map of the Smelter Site Study Area



- shoreline armoring - placing large rocks against the slag as a barrier to protect against erosion
- capping or dredging sediments
- further study of groundwater and sediments
- disposal of soil and demolition debris

The second phase of cleanup would begin once source control measures were completed and would include any necessary cleanup measures for groundwater at the smelter facility and the slag peninsula.

Investigation Findings

Soil: The contaminants which are of most concern in soil on the smelter site are metals and organic chemicals. Although metals are found throughout the site, the highest concentration of arsenic is in the area adjacent to the former arsenic kitchen, while the highest concentration of copper is in the cooling pond area.

Metal concentrations in the surface soil and soil at deeper levels vary across the site. Concentrations are lower near the former stack

and increase down the hillside in the former arsenic kitchen and cooling pond area. In most cases, surface soil samples have higher metal concentrations than subsurface soil samples at the same location.

Slag: Approximately 15,000,000 tons of slag were deposited along the shoreline and used to create the yacht club slag peninsula. Asarco used slag to extend the natural shoreline to expand its plant area. Slag contains high levels of metals, such as arsenic, copper and lead.

Surface Water: Surface water generally has elevated concentrations of arsenic, copper and other metals, along with organic compounds. Elevated concentrations of metals are also found in the stagnant pools of water on the site. Sample results show a pattern of increasing metal concentrations as water crosses the plant site. The highest levels were measured at the middle plant outfall. The south outfall has been shown to also contribute metals to groundwater.

Groundwater: Three groundwater aquifers (water-bearing zones) have been identified on the smelter facility. The two shallowest aquifers show elevated levels of arsenic, copper, zinc, and other metals. Water samples from the deeper aquifer have fewer elevated metal concentrations, which may have resulted from a production well drilled into the deeper aquifer during the smelter's operation.

Organic contamination has also been identified on the plant site. The chemical dimethylaniline was used in the production of sulfuric acid. Prior to the smelter operation, a sawmill was located in this area, and wood debris and sawdust appear to have been mixed into and buried below the slag. The decomposition of the wood and sawdust has released organic acids which caused the metals bound to the slag to be released into the groundwater. Groundwater flows toward the marine shoreline where contaminant concentrations exceed levels determined to be protective of human health and sea life.

Air: Emissions of contaminants into the air have been substantially reduced since the plant closed. In order to evaluate ongoing releases of contaminants into the air, Asarco analyzed wind data, collected samples at various plant site locations, and used a dust emissions model for the plant site. Modeling predicted that the highest dust emissions carrying contaminants occur on the plant site itself and decrease with distance from the smelter. The site currently meets air quality standards.

Yacht Club Peninsula: Samples collected during the drilling of groundwater monitoring wells show that the peninsula is made almost entirely of slag that contains elevated levels of metals. It appears that groundwater contaminant concentrations are higher in deeper wells on the peninsula than in the shallower wells. Most of the water found in the wells on the slag peninsula is seawater from the adjacent bay.

Off-Shore Sediments: Off-shore sediments are contaminated as a result of erosion of the slag shoreline and discharges of surface water and groundwater contaminated from the smelter facility. Approximately 103 acres of off-shore sediments may be cleaned up by active measures. Some contaminated sediments may be either too steep or too deep for active cleanup and may require monitoring.

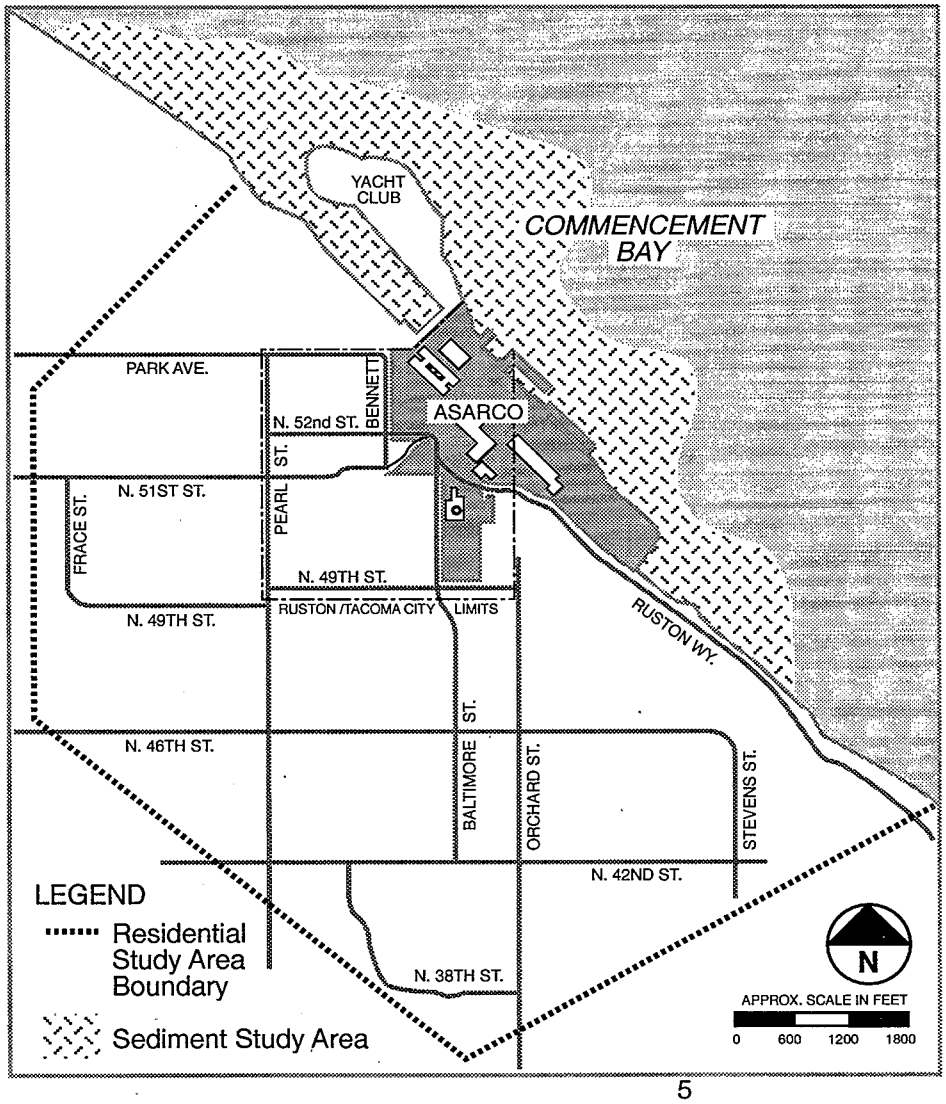
2 The Smelter Building Demolition

In 1987 and 1988, Asarco removed many of the most highly contaminated buildings from the plant property. Demolition of the remaining structures was officially underway when the 562 foot stack was imploded on January 17, 1993. After stack demolition, the bricks were leveled, covered with a plastic liner and soil, and the area was planted with grass.

Most of the buildings and structures on the southern end of the plant have been removed, the most noticeable being the cooling tower and the sulfur dioxide plant. Major demolition has also taken place on the northern end of the plant with the removal of the refinery buildings. Demolition should be complete by the end of 1994.

Before a building is torn down, it is washed to remove surface contamination on the walls, ceilings and floors. Once it is demolished, the debris is placed into piles on the site and sampled to determine where the material will go. Cleaned scrap metal is sent off site for recycling. Wood, concrete, and plastic determined to be clean go to an industrial landfill. Material that is still contaminated is stored on site in the Fine Ore Bins building which is the large building in the middle of the site. This material will be dealt with as part of the final Phase I remedy for the smelter. Once the structures are removed from the property, Asarco will collect samples from where the buildings once stood in order to determine appropriate cleanup measures. A billboard at the smelter provides information on areas which have already been demolished and structures which are planned for demolition.

Smelter Site, Marine Sediments, and Residential Study Areas



3 The Ruston/North Tacoma Residential Soil Cleanup

Arsenic and other metals related to the past operations of the Asarco Smelter are present in the soil and slag found in Ruston and north Tacoma. EPA is concerned about potential health effects from exposure to this contaminated soil and slag. It is unlikely that natural processes such as weathering or rain will reduce the amount of contamination in the soil. EPA developed a cleanup plan for the residential area and is working with Asarco to carry out the plan.

Soil Sampling

Test results confirmed that the highest levels of arsenic and other contaminants are generally found on properties located closest to the smelter. The test results also indicated the amount of contamination in soil tends to decrease as you move farther away from the smelter.

Soil in urban areas not affected by an arsenic-emitting source is expected to contain less than 20 parts per million (ppm) of arsenic. A concentration of one part per million corresponds to one part of arsenic per one million parts of soil. Test results show that the amount of arsenic in surface soil in the Ruston/ North Tacoma Study Area ranges from 2 to 3,000 ppm.

Most urban soil is expected to contain less than 250 ppm of lead. Test results of surface soil in the residential area indicated that the amount of lead, a contaminant associated with smelting operations, as well as other sources such as leaded gasoline and paint, ranges from 7 to 2,700 ppm.

Record of Decision

On June 16, 1993, EPA adopted a final cleanup plan for arsenic and lead contaminated soil and slag in the Ruston/North Tacoma Study Area. The plan, called a Record of Decision or ROD, focuses on removing and replacing contaminated residential soil that has arsenic and lead concentrations exceeding EPA's action levels (230 ppm of arsenic and 500 ppm of lead). Soil samples will be taken from properties in areas that EPA anticipates have arsenic and lead concentrations above the agency's action levels. In other areas, property owners will be allowed to request that their property be sampled. Where samples show that soil contamination exceeds EPA's action levels, the soil will be removed and replaced with clean soil. Sampling activities began in October 1993.

A small quantity soil disposal program is in place for owners of property within the Study Area that generate soil for disposal before the final cleanup of their property can be scheduled. To find out how you can participate and arrange for pickup and disposal, call Karen Pickett at the Asarco Information Center at (206) 756-5436. Coordination of cleanup activities with homeowners to define the extent of work to be performed on individual properties is ongoing.

Other elements of the cleanup plan include excavation of slag driveways and other areas with small slag particles and replacement with gravel and capping of dirt alleys and parking areas where soil exceeds action levels. The caps will either be made of asphalt, or the soil above action levels will be removed and replaced with clean gravel. Contaminated areas that are too steeply sloped to excavate will be fenced in and planted with low lying shrubs.

Development of a Community Protection Measures (CPMs) program is also a major element in the cleanup plan. The program includes the following elements: measures to control soil disturbances; soil testing, collection and disposal program; measures to reduce exposure and maintain the integrity of the soil caps; development of a property specific data base; notification to future property owners of property conditions; and evaluations of the effectiveness of the CPMs program.

Soil excavated prior to the end of 1994 will be temporarily stored at the north east plant area on the Asarco smelter property. By December 30, 1994, EPA will make a final decision regarding the disposal of stored soil.

Health Concerns

How Are People Exposed to the Contaminants?

Although residential property cleanup has begun, EPA is concerned that residents in the Ruston and north Tacoma area are or could be exposed to elevated levels of arsenic and lead. Various common behaviors can result in exposure to arsenic, lead, and other contaminants. These behaviors generally involve unintentionally swallowing, touching, or breathing contaminated soil and dust. For example, a person may ingest contaminated soil if dirty hands are placed near or in the mouth. Similarly, soil may be ingested if dirty hands are used to touch food, gum, or cigarettes that are then placed in the mouth.

Contaminated soil and dust may also be tracked into the home where it can settle on surfaces or objects that are contacted by people. For example, if an object such as a cup or a child's toy is placed in the mouth, contaminated dust on the object may be swallowed. A person may also be exposed by directly breathing contaminated soil or dust during outdoor activities such as gardening or playing in a dry dusty area, or in the home.

Exposure of children is of particular concern because of their more frequent hand-to-mouth behavior (such as thumb sucking or "mouthing" of objects). Also, a child is likely to exhibit behavior that will lead to more frequent contact with the contaminants, such as playing in contaminated soil or crawling on contaminated floors.

Less significant exposure may result from eating homegrown fruits or vegetables that have not been washed to remove accumulated dust or dirt.

Arsenic and lead are the two smelter-related contaminants of primary concern for human health in the residential area. The following is a discussion of the general types of health effects that have been associated with these metals.

Arsenic: Exposure to arsenic has been shown to increase a person's risk of developing cancer. Inhaling arsenic may increase the risk of developing lung cancer. Ingesting or swallowing arsenic may increase the risk of developing skin cancer as well as cancer in other parts of the body.

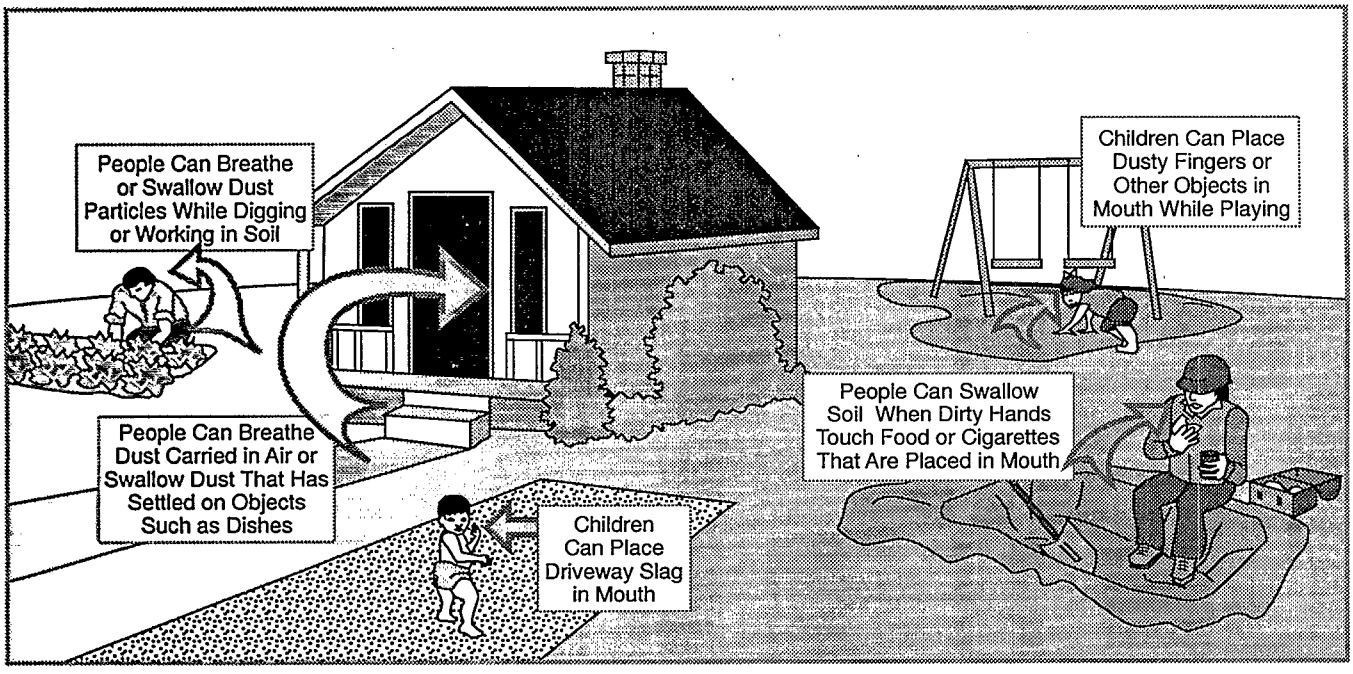
Arsenic can also cause other types of skin problems when ingested. The most characteristic problems include dark and light spots on the skin, and small "corns" on the palms, soles, and trunk of the body. In addition to skin problems, ingestion of arsenic has caused other effects, such as blood and nerve disorders.

Lead: When the amount of lead in soil or dust is more than 500 to 1,000 ppm, the level of lead in blood may increase above commonly occurring levels. Increased blood lead levels have been associated with behavior and learning problems in children, and increased blood pressure in adults. Lead exposure can also cause nerve, kidney, and blood cell damage, and may increase the risk of cancer.

Other Metals: EPA has found other metals associated with smelter operations in the residential area soil, including antimony, cadmium, copper, mercury, and silver. These metals are present in smaller amounts, but still exist at concentrations greater than typical urban soil values. While these metals are not likely to pose a significant health risk individually, the health effects of combined exposure are unknown.

Pathways of Contamination

Some Ways People Can Be Exposed to Contamination



How Can You Reduce Your Exposure to Contaminated Soil?

You can reduce your exposure to soil contaminants by paying close attention to personal hygiene and avoiding contact with contaminated soil. Here are some suggestions:

- Maintain grass in your yard to eliminate bare dirt.
- Wet soil before digging to minimize the dust that could be generated.
- Wear protective clothing such as coveralls or a long-sleeved shirt, pants, shoes, and gloves when you are disturbing the soil. Wash these clothes separately from other clothing.
- Wash your hands and face when you are finished with activities that disturb the soil, such as digging or gardening.
- Pay close attention to where children play. Exposure to arsenic and lead is reduced by playing on grass rather than on bare dirt.
- Wash children's hands and faces to remove dirt after playing.
- Remove soil from homegrown fruits and vegetables before you eat them by washing and peeling.
- Do not consume food or beverages while you are conducting activities that disturb the soil to avoid incidental ingestion.
- Do not smoke or chew gum or tobacco in the area where the soil is being disturbed.
- Use a wet mop or damp cloth to clean dust and dirt tracked into the home. Wipe your feet on a doormat or carpet and leave your shoes at the entrance of your house to minimize tracking dust and dirt into the house. Be aware that pets also track in dust and dirt.

For More Information

☑ Visit Asarco Information Center

The Asarco Information Center has information on the cleanup of all the Asarco projects. The center is located at 5311 North Commercial in Ruston and is staffed weekdays from 1:00 - 6:00 by Karen Pickett, (206) 756-5436.

☑ Contact EPA Staff

Use the phone numbers and address listed below to contact EPA staff, or call toll free on weekdays from 8 a.m. to 4:30 p.m. at:

1(800) 424-4EPA
Environmental Protection Agency
1200 Sixth Avenue, Seattle, WA 98101

EPA Project Managers in Seattle

Asarco On-Site and Sediments Cleanup
Piper Peterson: (206) 553-4951

Demolition
Kevin Rochlin: (206) 553-2106

Ruston/North Tacoma Residential Cleanup
Mary Kay Voytilla: (206) 553-2712

EPA Community Relations Coordinator in Seattle

Michelle Pirzadeh: (206) 553-1272

☑ Visit Information Repositories

You can find written information about the Asarco cleanup projects at any of the following ten information repositories.

Information Repositories

Tacoma Public Library, Main Branch
Northwest Room
1102 Tacoma Avenue South
Tacoma, Washington 98402
(206) 591-5622

McCormick Regional Branch Library
3722 North 26th Street
Tacoma, Washington 98407
(206) 591-5640

City of Tacoma Environmental Commission
747 Market Street
Suite 900
Tacoma, Washington 98402
(206) 591-5310

Tacoma Pierce County Health Department
Water Resources
3629 South D Street
Tacoma, Washington 98408
(206) 591-6553

Pacific Lutheran University Library
121st South and Park Avenue
Tacoma, Washington 98447
(206) 535-7500

Asarco Information Center
5311 N. Commercial
Tacoma, Washington 98407
(206) 756-5436

Citizens for a Healthy Bay
771 Broadway
Tacoma, Washington 98402
(206) 383-2429

Ruston Town Hall
5117 North Winnifred Street
Ruston, Washington 98407
(206) 759-3544

Washington Department of Ecology
Toxics Cleanup Program
4415 Woodview Drive, SE
Lacey, Washington 98503
(206) 438-3017

Environmental Protection Agency
Superfund Records Center
1200 Sixth Avenue
Seattle, Washington 98101
(206) 553-6512