

Cleanup Levels & Action Levels for Soil Arsenic and Lead

Tacoma Smelter Plume covers a 1,000 square mile area of King, Pierce, and Thurston counties. For almost 100 years, the Asarco company operated a copper smelter in Ruston and north Tacoma. Air pollution from the smelter settled on the surface throughout the plume. Arsenic, lead and other heavy metals are still in the soil as a result of this pollution.

The area closest to the former smelter is part of a federal Superfund cleanup site. Asarco removed contaminated soil from yards in the EPA Study Area under the oversight of the U.S. Environmental Protection Agency (EPA).

The Washington Department of Ecology (Ecology) is addressing soil contamination within and outside the Superfund site. Ecology has limited funding for this project, so we are focusing on areas of the highest concern:

- **Child play areas** - Places where children play at schools, childcares, parks, camps, and multi-family housing through the Soil Safety Program.
- **Residential yards** – Residential yards found in existing single-family or multi-family residential properties within the Yard Program service area.

Purpose of this FAQ

This FAQ explains two key concepts for making cleanup decisions and the science behind them:

- **Cleanup level** – Ecology has determined that no action is needed when arsenic and lead levels in soil are less than or equal to the cleanup level.
- **Action level** - Ecology will take action when arsenic or lead levels are greater than or equal to the action level.

This FAQ also explains where Ecology plans to replace soil and how we will address yards in the EPA Study Area. See page 6 for a map of the EPA Study Area and service area for the Yard Sampling and Cleanup Program (Yard Program).

TOPICS

- Purpose of the FAQ
- Cleanup levels
- Map
- Action levels
- EPA Study Area
- Ecology's Yard Program

FOR MORE INFORMATION

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Site Document Locations

Ecology's cleanup website
<http://www.ecy.wa.gov/toxics/tacoma-smelter.html>

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Cleanup Levels

Q: What are the cleanup levels for Tacoma Smelter Plume contamination?

A: The cleanup level for arsenic is 20 parts per million (ppm). The cleanup level for lead is 250 ppm. These cleanup levels protect both human health and the environment.

Q: Why is the arsenic cleanup level 20 ppm?

A: Ecology sets cleanup levels based on state law—the Model Toxics Control Act. For cancer-causing contaminants, we set cleanup levels to protect people against an increased lifetime cancer risk at one in a million. For arsenic, the risk-based cleanup number would be 0.67 ppm. However, arsenic occurs naturally in soils at levels higher than 0.67 ppm. In Washington, we consider “background” arsenic to be 20 ppm. That is where we set the cleanup level.

Q: What is the risk level at 20 ppm arsenic?

A: We estimate that being exposed to 20 ppm arsenic in soils may increase cancer risk by 30 in one million. That means in a population of one million people, there may be 30 cases above the background cancer rate. In other words, there would be 30 more cases of cancer than if there were no arsenic in soil.

Q: Why is the lead cleanup level 250 ppm?

A: Lead can cause learning difficulties and behavioral problems in infants and children. The level of lead in blood helps predict the potential for harm. Levels are in micrograms of lead per one-tenth liter of blood (ug/dL).

In 1991, Ecology set a soil cleanup level for lead of 250 ppm. This level should keep blood lead levels under 15 ug/dL for 99 percent of children, when soil is the main way they are exposed.

When Ecology set this level, if a child’s blood lead level was over 15 ug/dL, the Centers for Disease Control and Prevention had certain recommendations. It advised looking for possible sources of lead in the child’s environment and educating the family on ways to reduce exposure.

CLEANUP LEVELS



Ecology and EPA

Arsenic = 20 parts per million (ppm)
Lead = 250 ppm

ACTION LEVELS

Child Play Areas (Ecology)

Arsenic = 20 ppm
Lead = 250 ppm



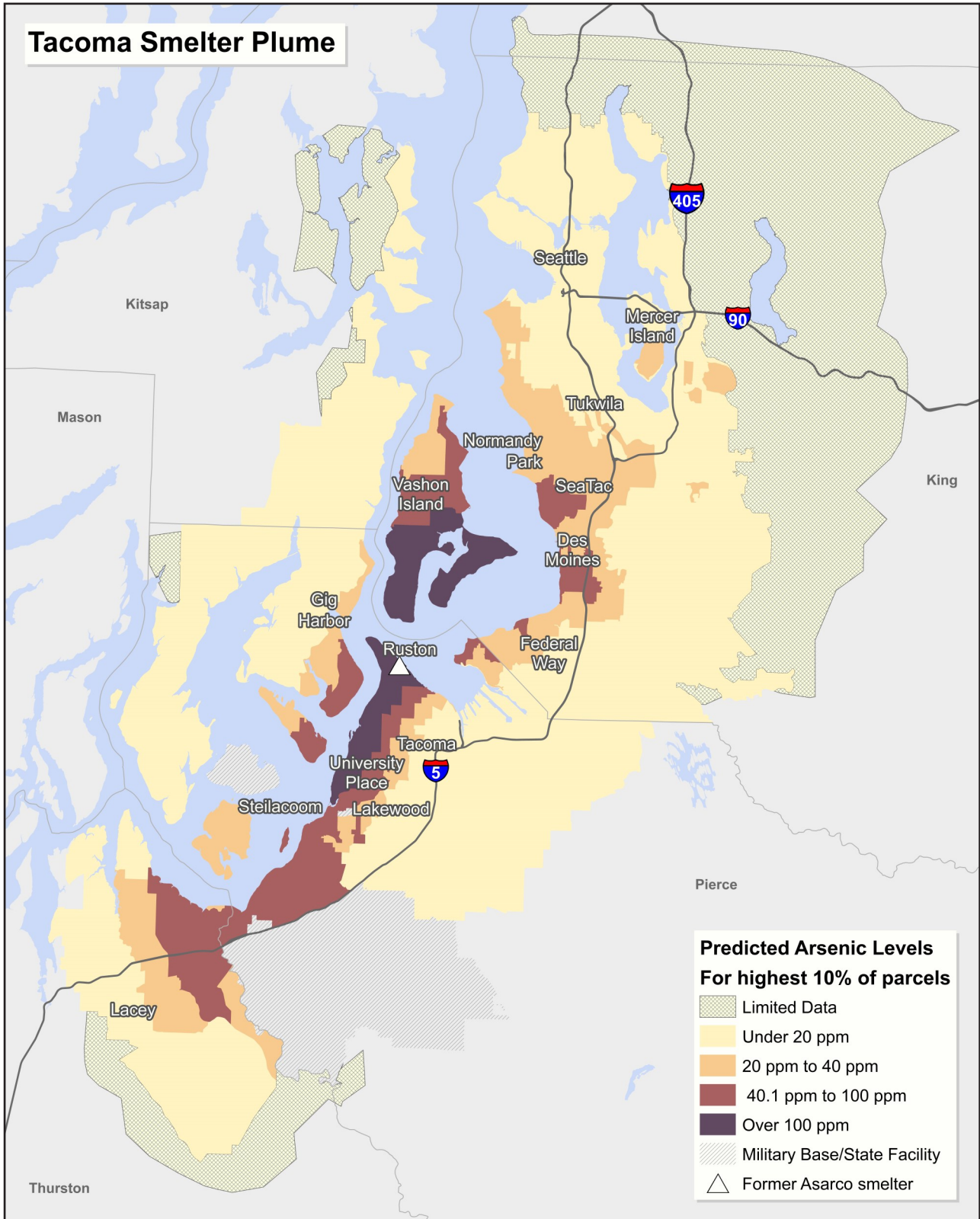
Residential Yards (Ecology)

Arsenic = 100 ppm
Lead = 500 ppm

EPA Study Area

Arsenic = 230 ppm
Lead = 500 ppm





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). This map is also available at: <https://fortress.wa.gov/ecy/smeltersearch/>.

Ecology Action Levels

Q: What is Ecology's action level for arsenic and lead at child play areas?

A: Ecology will take action in play areas where arsenic or lead is over the state cleanup level. That means the "action level" for arsenic is 20 ppm and lead is 250 ppm. Ecology may remove and replace the contaminated soil, or cover with play chips to keep children from playing directly in the contaminated soil.

Q: What do sampling results mean?

A: We look at the average of all sampling results and the highest value. A play area exceeds Ecology's action level if:

- Average arsenic is over 20 ppm or the highest value is over 40 ppm; or
- Average lead is over 250 ppm or the highest value is over 500 ppm.

Q: How did Ecology set the action levels for child play areas?

A: We set our action levels at the state cleanup levels because they are the most protective of human health. There are multiple children playing in established play areas many days of the year. Also, there may be less supervision of hand-washing and other measures that can reduce exposure to soil, than at home.

Q: What is Ecology's action level for replacing soil on residential yards?

A: The action level for residential yards is 100 ppm arsenic or 500 ppm lead. Ecology will remove soil with arsenic above 100 ppm or lead above 500 ppm. They will then replace with soil that is below the state cleanup level of 20 ppm arsenic and 250 ppm lead.

Q: What is the risk level at 100 ppm arsenic?

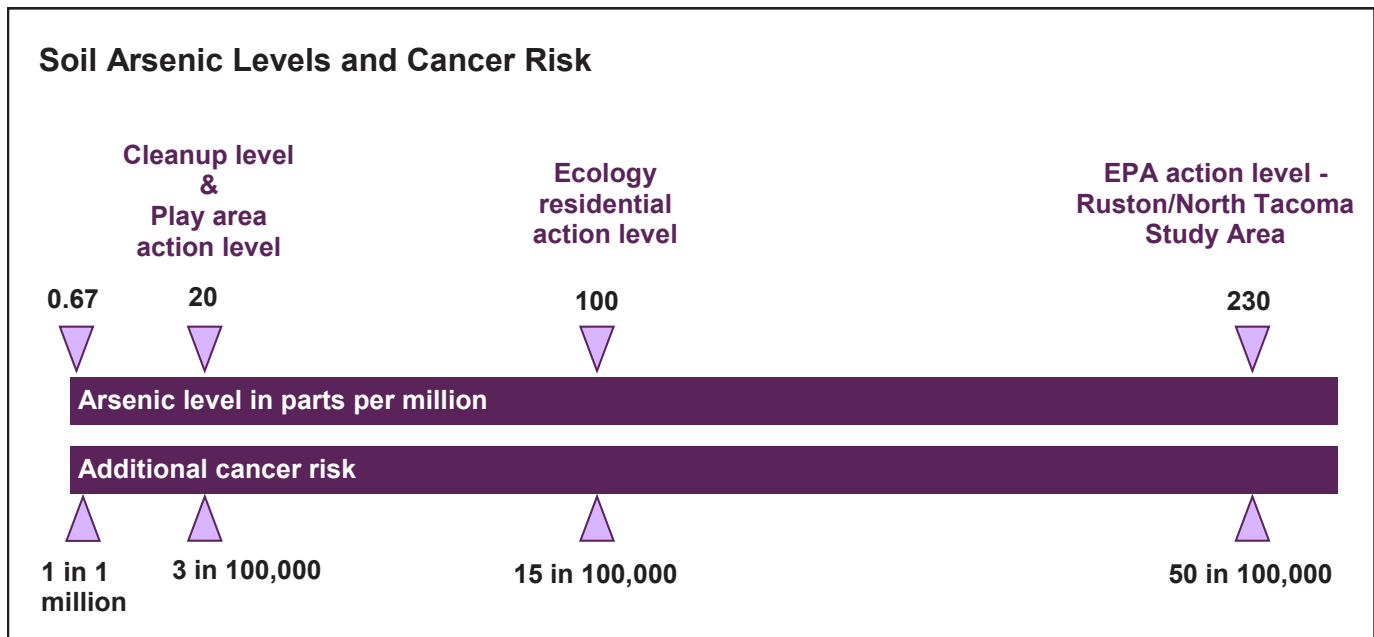
A: We estimate that being exposed to 100 ppm arsenic in soils may increase cancer risk by 150 in one million. That means in a population of one million people, there may be 150 cases above the background cancer rate. This is five times higher than the risk at 20 ppm.

Q: Why did Ecology set different action levels for residential yards?

A: Ecology does not have the resources to replace soil on every yard over 20 ppm arsenic or 250 ppm lead. An action level helps us prioritize our limited funding. This still leaves us the option to replace soil on yards with arsenic and lead below the action levels in the future, if we have funding.

Q: How did Ecology set the proposed action levels for yards?

A: The proposed action level of 100 ppm for arsenic uses less conservative cancer risk assumptions while still protecting for non-cancer health effects. We adjusted the risk level to the upper end of the nationally-acceptable cancer risk of one in ten thousand. For lead, the action level increases the chance of blood lead levels exceeding 15 ug/dL from one percent to five percent.



Soil Arsenic Levels and their associated cancer risks

EPA Action Levels

Q: What is the EPA's action level for the EPA Study Area?

A: EPA set an action level of 230 ppm arsenic. EPA replaced soil on these yards to the state cleanup level of 20 ppm arsenic or lower.

Q: How did EPA set its action level for arsenic?

A: EPA also looked at human health risk when deciding where to take action. The action level of 230 ppm equates to an additional cancer risk of one in 2,000. This is within EPA's "acceptable risk range." For this site, EPA decided that community education would protect human health where arsenic was between 20 and 230 ppm.

Q: What is Ecology doing about yards in the EPA Study Area with arsenic over 100 ppm in the soil?

A: Ecology offers soil replacement to yards where the parcel average remains above 100 ppm arsenic, even if the EPA performed soil replacement. In some cases, EPA has already placed a thick enough protective layer of new soil over the arsenic contamination. In these cases, we do not offer additional soil replacement. Ecology only offers soil replacement for yards with the highest risk of human exposure.

Ecology's Yard Sampling and Cleanup Program (Yard Program)

Q: What is the Yard Program?

A: The Yard Sampling and Cleanup Program provides free soil sampling for over 5,000 residential yards in the service area (see map right). We also offer free soil removal and replacement for portions of yards with levels over the action levels.

Q: How do I find information for my yard?

A: To find out if your property is in the service area for the Yard Program, visit www.DirtAlert.info. For sampling and soil replacement records for your property, visit our public database at: <https://fortress.wa.gov/ecy/areispublic/>.

Q: How does sampling work?

A: Before our contractor can sample, the homeowner must sign a form that gives them permission to access to the yard. Sampling involves digging small holes, scraping soil samples out, and refilling the hole. It usually takes a few hours.

Q: How does soil removal and replacement work?

A: There are two steps:

- **Soil removal** - Digging up contaminated soil and disposing of it in a landfill.
- **Soil replacement** – Refilling the excavated area with clean soil. We then sample the bottom of the excavated area to see if the soil is above the action level. If the soil is above the action level, we cover the remaining contaminated soil with a geotextile fabric and clean soil. The fabric creates a barrier and visual warning to future residents that contaminated soil remains below.

Soil replacement may take up to ten weeks for a yard and it will be disruptive. During soil replacement, we replace the soil and landscape the property. We start the planning process a year before soil replacement takes place and work with the homeowner along the way. The Yard Program is free for qualifying properties. However, property owners are responsible for associated costs that come with maintaining new landscaping.



Service area for the Yard Program



Contractors remove contaminated soil on yard.