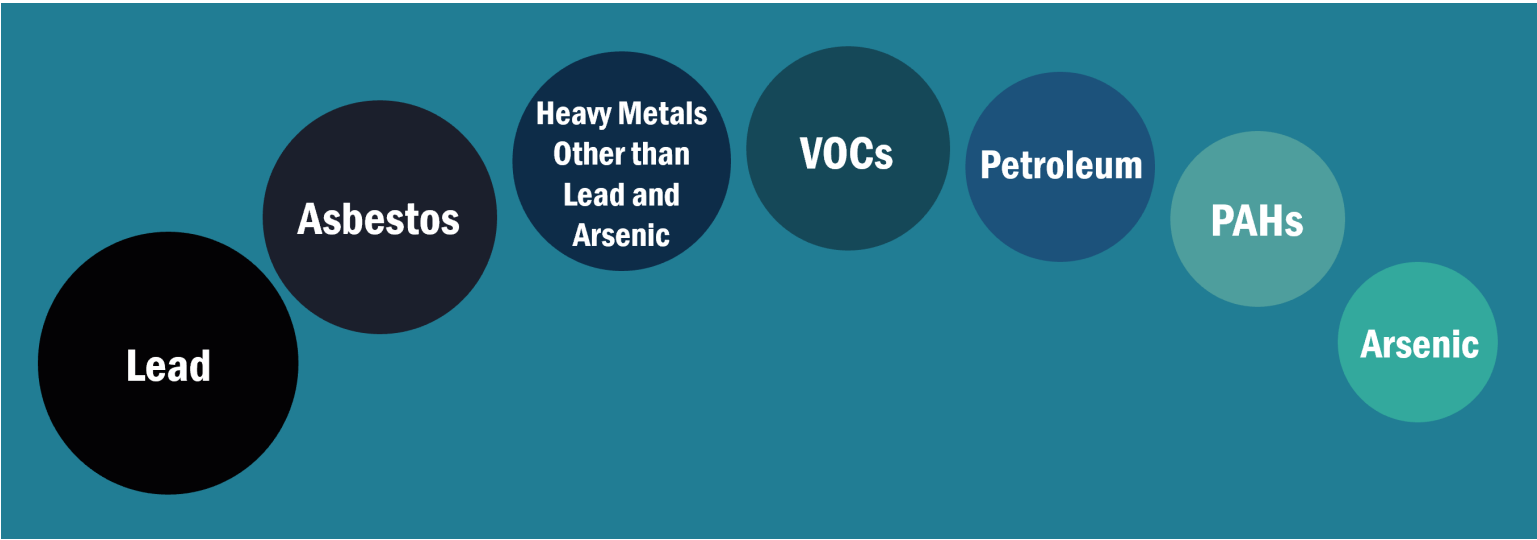


Environmental Contaminants Often Found at Brownfield Sites

Brownfield properties are often overlooked for reuse or redevelopment due to fear of environmental contamination. Understanding the **types of contaminants present** (or potentially present) and **how people may be exposed to those contaminants** will help a community plan cleanup and site reuse options that limit exposure risk.

U.S. EPA, states and Tribes have programs that can help communities identify properties that are brownfields, determine whether the property is environmentally contaminated, address contamination when needed and plan for site reuse that will bring new benefits to the community.

The figure below shows in decreasing order from left to right the contaminants most commonly reported from brownfields that have been assessed or cleaned up using U.S. EPA grant funds. ⁱ




The following table provides an overview of various contaminants, categorized by their substance type (e.g., metal, fiber, oil), along with examples of their historical uses.

Contaminant	Substance Type	Examples of Past Uses
1. Lead (Pb)	Metals	Mining, fuel, paint, inks, piping, batteries, ammunition
2. Asbestos	Fiber in rock	Mining and processing, piping, insulation, fire proofing, brakes
3. Heavy Metals other than Lead and Arsenic	Metals	Metal fabrication, plating, mining, industry/ manufacturing
4. Volatile organic compounds (VOCs)	Manmade chemicals	Industry and commercial product solvents, degreasers, paint strippers, dry cleaning
5. Petroleum	Oil, hydrocarbon compounds	Drill and refining, fuel, chemical and plastic production
6. Polycyclic aromatic hydrocarbons (PAHs)	Hydrocarbon compounds, combustion byproduct	Coal tar, creosote, soot, fire, industry/ manufacturing byproduct
7. Arsenic (As)	Metals	Pesticides, agriculture, manufacturing, wood preservative

Contaminants can cause a range of health effects when a person is exposed, and the contaminant is absorbed into the body. **Exposure pathways** refer to the ways people come into contact or are exposed to a contaminant. **The extent of exposure and absorption depends on how much contaminant is present, how a person is exposed, how often and how long they are exposed.** Sensitive populations may be at greater risk from exposures, such as children, the elderly and those with chronic conditions.


The three basic exposure pathways are (1) breathing, (2) eating or drinking, and (3) direct contact with the skin. Of the three, breathing and eating or drinking are the most common but all three can occur.

INHALATION




When contaminants attach to small dust and soil particles or occur as a vapor, **breathing** can expose people.

INGESTION



Exposure can occur when people **eat or drink** contaminated water, food, dusts or soils. Children that suck their fingers or chew toys contaminated with dust or soils may be exposed.

SKIN TRANSFER



Skin can absorb some forms of contaminants from **direct contact** with contaminated dust and soil particles, the contaminants or vapors.

The following table lists the potential health effects of each contaminant.

Contaminant	Potential Health Effects
1. Lead (Pb)	Damage to brain, nerves, organs, and bone; cancer
2. Asbestos	Lung scarring, mesothelioma and lung cancer
3. Heavy Metals other than Lead and Arsenicⁱⁱ	Immune, cardiovascular, developmental, gastrointestinal, neurological, reproductive, respiratory and kidney damage; cancer
4. Volatile organic compounds (VOCs)	Eye irritation; nausea; liver, kidney and nervous system damage; birth defects; cancer
5. Petroleum	Headache; nervous system, immune, liver, kidney, and respiratory damage; cancer
6. Polycyclic aromatic hydrocarbons (PAHs)	Liver disorders; cancer
7. Arsenic (As)	Nausea, vomiting and stomach pain; blood disorders; nerve damage; skin disease; lung and skin cancer

ⁱ EPA grant recipients are required to report the presence of contaminants found and cleaned up through EPA’s Assessment, Cleanup and Redevelopment Exchange System (ACRES). The following information is based on reported contaminants at 4,455 properties that have completed a Phase II assessment, supplemental assessment, or cleanup from 2020-2024. This data is publicly available at <https://www.epa.gov/cleanups/cleanups-my-community>.

ⁱⁱ Heavy metals other than Lead and Arsenic includes Cadmium, Chromium, Mercury, Selenium, Copper, Iron, and Nickel. Due to the significant prevalence of Lead and Arsenic reported from brownfields that have been assessed or cleaned up using EPA grant funds, Lead and Arsenic are represented separately from the other heavy metals identified by grantees.