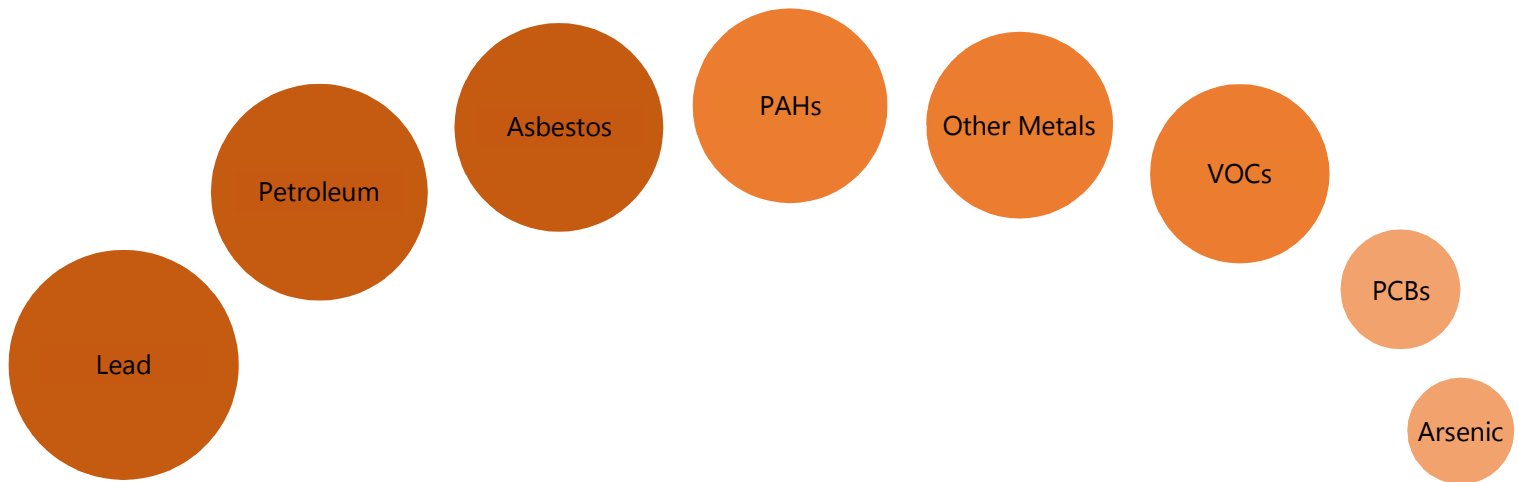


Environmental Contaminants Often Found at Brownfield Sites

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.

Below are the contaminants most commonly reported from brownfields cleaned up using U.S. EPA grant funds. Each circle's size reflects how often the contaminant was reported to the U.S. EPA.¹



Contaminant	Substance Type	Examples of Past Uses
1. Lead (Pb)	Metals	Mining, fuel, paint, inks, piping, batteries, ammunition
2. Petroleum	Oil, hydrocarbon compounds	Drill and refining, fuel, chemical and plastic production
3. Asbestos	Fiber in rock	Mining and processing, piping, insulation, fire proofing, brakes
4. Polycyclic aromatic hydrocarbons (PAHs)	Hydrocarbon compounds, combustion byproduct	Coal tar, creosote, soot, fire, industry/ manufacturing byproduct
5. Other metals	Metals	Metal fabrication, plating, mining, industry/ manufacturing
6. Volatile organic compounds (VOCs)	Manmade chemicals	Industry and commercial product solvents, degreasers, paint strippers, dry cleaning
7. Polychlorinated Biphenyls (PCBs)	Manmade chemicals	Heat and electrical transfer fluids, lubricants, paint and caulk, manufacturing, power plant
8. 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 a 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.



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



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

Contaminant

Potential Health Effects

1. Lead (Pb)	Damage to brain, nerves, organs, and bone; cancer
2. Petroleum	Headache; nervous system, immune, liver, kidney, and respiratory damage; cancer
3. Asbestos	Lung scarring, mesothelioma and lung cancer
4. Polycyclic aromatic hydrocarbons (PAHs)	Liver disorders; cancer
5. Other metals ²⁻⁵	Immune, cardiovascular, developmental, gastrointestinal, neurological, reproductive, respiratory and kidney damage; cancer
6. Volatile organic compounds (VOCs)	Eye irritation; nausea; liver, kidney and nervous system damage; birth defects; cancer
7. Polychlorinated Biphenyls (PCBs)	Disruption or damage to the immune, hormone and neurological system; liver and skin disease
8. Arsenic (As)	Nausea, vomiting and stomach pain; blood disorders; nerve damage; skin disease; lung and skin cancer

¹ U.S. EPA grant recipients are required to report the presence of contaminants found and cleaned up through U.S. EPA's Assessment, Cleanup and Redevelopment Exchange System (ACRES). The following information is based on grant recipient reported cleanups completed at 1,417 sites from 2006-2018. This data is publicly available at www.epa.gov/cleanups/cleanups-my-community

² Other metals category includes a range of metals not limited to the heavy metals listed below

³ Cadmium, Integrated Risk Information System, U.S. Environmental Protection Agency. https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=141

⁴ Chromium Compounds, U.S. Environmental Protection Agency. <https://www.epa.gov/sites/production/files/2016-09/documents/chromium-compounds.pdf>

⁵ Mercury, U.S. Environmental Protection Agency. <https://www.epa.gov/mercury>