

Coal Ash Toxics: Damaging to Human Health

The toxic substances found in coal ash can inflict grave damage to the human body and the environment. These substances have been shown to escape from some coal ash disposal sites, contaminating the air, land, surface waters, and/or underground aquifers that feed drinking water wells.

Many people are still not aware of **how toxic coal ash is, or how much of it exists:**

- Coal ash commonly contains some of the earth's deadliest toxics: **arsenic, lead, mercury, cadmium, chromium and selenium.**
- The toxic metals in coal ash can leach out of ash disposal sites, especially from wet storage, and contaminate surface waters and underground aquifers, where they can cause cancer and neurological harm in humans and can poison fish.
- There are nearly a thousand sites at which coal ash is disposed across the nation: 584 surface ponds and 337 dry landfills. Coal ash disposal facilities exist in all the U.S. states except Rhode Island, Vermont and Idaho.
- Coal ash is the second-largest industrial waste stream in the U.S., after mining wastes.

Among the effects of the most dangerous toxicants in coal ash are:

Arsenic: It has long been known that arsenic, if ingested in very high levels, is deadly. However, lower levels of exposure are also harmful and can cause nausea, vomiting, and diarrhea; anemia and decreased production of the white, infection-fighting blood cells; abnormal heart rhythms; blood vessel damage; numbness in the hands and feet; partial paralysis; and decreased vision, even blindness. Repeated low levels of exposure over an extended period of time can produce effects similar to a one-time high level of exposure, and chronic exposure to low levels can cause skin cancer. Arsenic has also been linked to cancers of the lung, bladder, kidney, liver and prostate.

Contaminated drinking water is a primary route of arsenic exposure. Exposure from birth may increase urinary cancer risk much later in life, suggesting that people whose drinking water is contaminated by arsenic from coal ash should be monitored long-term for this cancer, even if they stop drinking the contaminated water.

Lead: As a very potent neurotoxicant, lead is highly damaging to the nervous system. This fact has been recognized for thousands of years, and for the last century, it has been recognized that children are particularly sensitive. High levels of lead exposure result in swelling of the brain, kidney disease, damage to hemoglobin, and death. But even low levels

harm the developing nervous system. There is no safe level of lead exposure, particularly for children.

Mercury: Another well-known neurotoxicant, mercury has the dangerous capacity to bioaccumulate, or build up in animal tissue. When mercury leaches from coal ash into soil or water, it is converted by bacteria into an organic form which can be absorbed by small organisms and the larger organisms that in turn eat them. As it moves up the food chain, the concentration of methylmercury increases. When it has accumulated to high concentrations in fish, this becomes a major pathway for human exposure.

Mercury is particularly toxic to the developing nervous system. Exposure during gestation, infancy, or childhood can cause developmental delays and abnormalities, reduced IQ and mental retardation, and behavioral problems. State agencies regularly issue fish consumption advisories to protect women of child-bearing age and children from eating mercury-contaminated fish. The FDA has set a limit of 1 part per million of methylmercury in fish.

Cadmium: Cadmium can be absorbed when ingested (taken orally) or when inhaled. Fortunately, ingestion of cadmium by mouth results in low levels of absorption. When it is inhaled, however, the lungs readily absorb it into the bloodstream. Chronic exposure can result in emphysema and other obstructive lung diseases, and kidney disease. It may also contribute to hypertension and lung cancer. Cadmium affects calcium metabolism, and therefore can cause bone mineral loss, with associated bone pain, osteoporosis, and fractures.

Chromium: In the form of chromium (III), this is an essential nutrient, but the other common form, chromium (VI), is highly toxic. Chromium can leach from coal ash into the surrounding soil and water. When ingested in contaminated water, chromium (VI) can cause stomach and small intestine ulcers. Frequent ingestion of large amounts can result in anemia and stomach cancer. Contact with the skin by some compounds of chromium (VI) can result in skin ulceration. When inhaled in large amounts, chromium (VI) can cause asthma and other breathing problems, nasal ulcers, and lung cancer.

Selenium: This common element is an essential nutrient, and too little as well as too much can be harmful. Selenium is ingested by eating plants and in drinking water. Extremely high levels of selenium have been found to accumulate in fish and amphibians living in coal ash-contaminated waterways and wetlands. As confirmed by laboratory studies, selenium accumulation in fish and frogs is linked to physical abnormalities including severe developmental abnormalities and deformities, and has been held responsible for exterminating some local fish populations. Livestock that graze on plants with very high selenium levels exhibit a dramatic neurologic disease known as “blind staggers.” Symptoms include depressed appetite, impaired vision and staggering in circles, and can ultimately lead to paralysis and death. Chronic exposure to high levels in humans has been shown to cause lack of mental alertness and listlessness, as well as discoloration of the skin and deformities of the nails.