

Coal Ash: Hazardous to Human Health

What is coal ash? Coal ash is the waste that is left after coal is combusted (burned). It includes fly ash (fine powdery particles that are carried up the smoke stack and captured by pollution control devices) as well as coarser materials that fall to the bottom of the furnace. Most coal ash comes from coal-fired electric power plants.

Why is it dangerous? Depending on where the coal was mined, coal ash typically contains heavy metals including arsenic, lead, mercury, cadmium, chromium and selenium, as well as aluminum, antimony, barium, beryllium, boron, chlorine, cobalt, manganese, molybdenum, nickel, thallium, vanadium, and zinc.ⁱ If eaten, drunk or inhaled, these toxicants can cause cancer and nervous system impacts such as cognitive deficits, developmental delays and behavioral problems. They can also cause heart damage, lung disease, respiratory distress, kidney disease, reproductive problems, gastrointestinal illness, birth defects, and impaired bone growth in children.

How dangerous is coal ash to humans? The Environmental Protection Agency (EPA) has found that living next to a coal ash disposal site can increase your risk of cancer or other diseases. If you live near an unlined wet ash pond (surface impoundment) and you get your drinking water from a well, *you may have as much as a 1 in 50 chance of getting cancer* from drinking arsenic-contaminated water.ⁱⁱ Arsenic is one of the most common, and most dangerous, pollutants from coal ash. The EPA also found that living near ash ponds increases the risk of damage from cadmium, lead, and other toxic metals.

Is coal ash a big problem? The EPA estimates that 140 million tons of coal ash are generated annually.ⁱⁱⁱ That makes coal ash the *second largest industrial waste stream in the United States*, second only to mine wastes. Coal ash is disposed at nearly a thousand sites across the nation, in all states except Rhode Island, Vermont and Idaho.

What do they do with all that ash? More than a third is disposed in dry landfills, frequently at the power plant where the coal was burned. Coal ash may also be mixed with water and disposed in so-called “ponds” – some are more like small lakes – behind earthen walls. These wet “surface impoundments” account for about a fifth of coal ash disposal.^{iv} About 38 percent of coal ash is “recycled” in agricultural and engineering applications rather than being disposed, and an additional five percent is dumped in abandoned mines as fill.^v

Are these disposal sites risky? Two factors dramatically increase the risk from disposal units: the use of wet surface impoundments instead of dry landfills, and whether disposal units have composite liners to prevent leaking and leaching. Surface impoundments (the wet ash ponds) consistently show higher risks than landfills.^{vi} Some are little more than pits in the earth, totally lacking in protective liners.

What about recycling? Coal ash recycling poses health risks, especially where the ash is exposed to water: for example when sprinkled as cinders on snowy roads, spread as agricultural fertilizer, or used as a landfill or to fill abandoned mines. These uses risk leaching into ground water or surface water.

What is “leaching”? When coal ash comes into contact with water, its toxic constituents can “leach” or dissolve out of the ash and percolate through water. *Coal ash toxics have leached from disposal sites in more than 100 communities*, carrying toxic substances into above-ground waterways such as rivers, streams and wetlands, and into underground water supplies or aquifers that supply drinking wells, forcing families to find new drinking supplies. One community has even been designated a Superfund toxic cleanup site, due to coal ash leaching that contaminated the drinking water.^{vii}

Is leaching the only threat from coal ash? Coal ash toxics also travel through the environment due to erosion and runoff, and through the air as fine particles or dust.

Has coal ash actually caused harm? The law requires the EPA to examine documented cases of coal ash disposal “in which **danger to human health or the environment has been proved**”.^{viii} The EPA has formally identified 70 of these damage cases where coal ash poison has contaminated drinking water, wetlands, creeks, or rivers.^{ix} In addition, two nonprofit organizations, Earthjustice and the Environmental Integrity Project, using information in the files of state agencies, have documented an additional 31 cases shown to have caused contamination.^x This brings the total number of damage cases to more than 100, with more being investigated.

Just how bad are the damage cases? The examples below indicate how bad it can get.

Giant spill: Just before Christmas 2008, at a coal-fired power plant in Kingston, TN, the earthen wall holding back a 40-acre coal ash disposal pond failed. More than a billion gallons of water and coal ash spilled into the adjacent river valley, covering some 300 acres with thick, toxic sludge, destroying three homes and contaminating the Emory and Clinch Rivers.^{xi} When the EPA tested water samples after the spill, they found arsenic at 149 times the allowable standard for drinking water, as well as elevated levels of other toxic metals including lead, thallium, barium, cadmium, chromium, mercury, and nickel.^{xii}

Leaching contaminates drinking water wells with lead: Coal ash generated by the Niagara (NY) Mohawk Power Corporation on Lake Erie was found to be contaminating nearby wells with lead, a very potent neurotoxicant that can harm the developing nervous system, even at low levels of exposure. Contaminated wells could no longer be used. The landfill owner was ordered to close the facility, and monitoring of ground water and surface water were expected to continue for 30 years after final closure of the facility.^{xiii}

Contamination from use as “fill”: At a 216-acre golf course in Chesapeake, VA, 1.5 million cubic yards of fly ash were recycled to give contour to the course. When groundwater at the golf course was tested, arsenic, boron, chromium, copper, lead and vanadium were detected.^{xiv}

PSR concludes that coal ash is dangerously toxic and poses a threat to human health. Its wet storage should be phased out, and its dry storage should be engineered for maximum control to prevent leaching, blowing or leakage of toxicants.

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- ⁱ U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Office of Resource Conservation and Recovery. "Human and Ecological Risk Assessment of Coal Combustion Wastes." Draft EPA document. April 2010. Pp 2-4.
- ⁱⁱ U.S. Environmental Protection Agency (EPA), "Human and Ecological Risk Assessment of Coal Combustion Wastes" (draft). (Released as part of a Notice of Data Availability) Aug. 6, 2007.
- ⁱⁱⁱ Hazardous and Solid Waste Management System Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities. Proposed rule. Page 344.
<http://www.epa.gov/wastes/nonhaz/industrial/special/fossil/ccr-rule/ccr-rule-prop.pdf>
- ^{iv} Barry Breen, Acting Assistant Administrator, Office of Solid Waste and Emergency Response, US EPA. Testimony delivered to Committee on Transportation and Infrastructure, Subcommittee on Water Resources and the Environment, U.S. House of Representatives, April 30, 2009.
<http://transportation.house.gov/Media/file/water/20090430/EPA%20Testimony.pdf>
- ^v Barry Breen, Acting Assistant Administrator, Office of Solid Waste and Emergency Response, US EPA. Testimony delivered to Committee on Transportation and Infrastructure, Subcommittee on Water Resources and the Environment, U.S. House of Representatives, April 30, 2009.
<http://transportation.house.gov/Media/file/water/20090430/EPA%20Testimony.pdf>
- ^{vi} RTI. "Human and Ecological Risk Assessment of Coal Combustion Wastes. Draft document." Prepared for U.S. Environmental Protection Agency, Office of Solid Waste. 2007.
<http://www.publicintegrity.org/assets/pdf/CoalAsh-Doc2.pdf>
- ^{vii} U.S. Environmental Protection Agency, Office of Solid Waste. *Coal Combustion Waste Damage Case Assessments*. July 9, 2007. Downloaded from <http://www.publicintegrity.org/assets/pdf/CoalAsh-Doc1.pdf>
- ^{viii} "Regulatory Determination on Wastes from the Combustion of Fossil Fuels (Final Rule)." Federal Register 65:99 (May 22, 2000) p. 32218
- ^{ix} U.S. Environmental Protection Agency. "Appendix Q. 1948-2008 US Historical Damage Cases Associated with Electric Utility Plant CCR Disposal Units." In docket folder, proposed rule; downloaded from <http://www.regulations.gov/search/Regs/home.html#docketDetail?R=EPA-HQ-RCRA-2009-0640>
- ^x Stant J. "Out of Control: Mounting Damages from Coal Ash Waste Sites." February 24, 2010. Environmental Integrity Project and Earthjustice. http://www.environmentalintegrity.org/news_reports/news_02_24_10.php
- ^{xi} Testimony of Stephan A. Smith, DVM, Executive Director, Southern Alliance for Clean Energy. Submitted to the U.S. Senate Committee on Environment and Public Works. January 8, 2009.
http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=e918d2f7-9e8b-411e-b244-9a3a7c3359d9
- ^{xii} Testimony of Stephan A. Smith, DVM, Executive Director, Southern Alliance for Clean Energy. Submitted to the U.S. Senate Committee on Environment and Public Works. January 8, 2009.
http://epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=e918d2f7-9e8b-411e-b244-9a3a7c3359d9
- ^{xiii} U.S. Environmental Protection Agency. HAZARDOUS AND SOLID WASTE MANAGEMENT SYSTEM; IDENTIFICATION AND LISTING OF SPECIAL WASTES; DISPOSAL OF COAL COMBUSTION RESIDUALS FROM ELECTRIC UTILITIES. [EPA-HQ-RCRA-2009-0640; FRL-9149-4] Proposed rule. Page 220. <http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccr-rule/fr-corrections.pdf>
- ^{xiv} U.S. Environmental Protection Agency. HAZARDOUS AND SOLID WASTE MANAGEMENT SYSTEM; IDENTIFICATION AND LISTING OF SPECIAL WASTES; DISPOSAL OF COAL COMBUSTION RESIDUALS FROM ELECTRIC UTILITIES. Proposed rule, Appendix, page 426.
<http://www.epa.gov/wastes/nonhaz/industrial/special/fossil/ccr-rule/ccr-rule-prop.pdf>