

Cotter at the Crossroads

A community
grapples with a
uranium mill's past,
present and future



What's in there?

Jackie Hutchins

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Following are toxicological profiles written for substances known to be either at the Cotter Corp. site or at the Maywood Interim Storage Site in New Jersey include:

Aluminum

The most common metal in the earth's crust, aluminum can be found in forms as varied as beverage cans to antacids and antiperspirants to processed foods.

Exposure to it is not usually harmful. It has not been shown to cause cancer in humans. Some studies have linked exposure to high levels of aluminum to Alzheimer's disease, but other studies are less conclusive.

People with kidney problems may be less able to process aluminum from their bodies, leaving them with a high enough concentration to cause bone or brain disease.

Arsenic

Formerly used as a pesticide, arsenic today is used primarily to treat wood to prevent decay.

Swallowing inorganic arsenic in large quantities can lead to death. In smaller doses it can increase the risk of cancers of the lungs, liver, kidneys, bladder and prostate.

Breathing in high levels of inorganic arsenic can cause lung irritation and sore throats. Over the long term it can cause skin, circulatory and nervous disorders.

Beryllium

Beryllium is mined from rocks, soils and volcanic dust and used to produce alloys used for electronic parts and construction parts for machinery. It also is used in nuclear weapons and reactors, X-ray machines, mirrors, televisions, calculators and personal computers.

It can be emitted into the air from the burning of coal and oil.

Effects on health depend on how much and how long the exposure to beryllium is. Exposure can cause chronic beryllium disease, a disease that causes weakness and difficulty breathing.

There may be an increased risk of lung cancer, but studies have been inconclusive.

Cadmium

Most cadmium in the United States is a byproduct of production of other metals. It is used in batteries, pigments, metal coatings and

plastics.

Effects on the body from inhaling too much cadmium can include kidney disease, lung damage and fragile bones. It is also considered a probable human carcinogen.

Chromium

Chromium comes in several forms - from a form needed to promote the action of insulin in the human body to forms used for chrome plating, leather tanning and wood preserving.

Long-term exposure to some forms of chromium in the air can lead to lung cancer, but not all forms cause adverse effects. The forms calcium chromate, chromium trioxide, lead chromate, strontium chromate and zinc chromate are considered human carcinogens.

Copper

Copper is an essential element for humans. Its uses range from the common penny to use in agriculture and water treatment.

In most forms it cannot easily affect human health.

Though some copper is needed for health, large amounts can cause nose, mouth and eye irritation, headaches, dizziness, nausea and diarrhea. High intakes also can cause liver and kidney disease and death.

It is not known to cause cancer.

Iron

Although iron is essential for health, too much iron can be toxic. Excess iron is stored in the tissues and organs of the body, where it can worsen infectious diseases or neurological problems, or cause diabetes, according to the Iron Overload Diseases Association.

Lead

Though two of its former uses - as an additive in gasoline or paint - were discontinued due to health concerns, lead still can be found in batteries, ammunition and computer circuit boards.

Most of the lead ingested by an adult will be processed out of the body, but only about a third of that ingested by a child is processed out. Lead that remains in the body generally is stored in the bones.

The nervous system is the main target for lead-caused health problems. High levels can damage the brain and kidneys.

Manganese

Manganese metal mixed with iron forms steel. It also is used in products as diverse as dietary aids and pesticides.

With too little manganese, people can experience slow blood clotting, skin problems and changes in metabolism. Too much can cause injury to the part of the brain that controls body movement. Breathing in too much can cause lung irritation and possibly lead to lung infection.

Mercury

A shiny metal that is liquid at room temperature, mercury is commonly used in thermometers, barometers, batteries and metal tooth-fillings.

Mercury vapors can enter the bloodstream through the lungs and go quickly to the kidneys and brain. Permanent brain damage can occur if the levels are high enough. There can also be kidney damage from high exposures, but the kidneys usually can recover.

The Environmental Protection Agency considers mercury chloride and methylmercury to be possible human carcinogens.

Molybdenum

Molybdenum is a metallic element used as an alloy to strengthen metals.

According to the EPA, repeated exposure can cause an increase in uric acid and gout-like symptoms in humans.

Nickel

Nickel is commonly used in alloys with other metals. It is found in the soil of the earth's crust, as well as in meteorites. It can be found in stainless steel, coins and jewelry.

People can be exposed through handling coins and by eating chocolate, soybeans, nuts and oatmeal. Most of the nickel ingested leaves the body through urine.

Exposure to nickel dust can cause lung and nasal cancers.

The EPA believes nickel refinery dust and nickel subsulfide are human carcinogens.

Radium

Radium is a naturally occurring radioactive metal that occurs when uranium and thorium decay.

As radium itself decays, it produces radiation and other "daughter" substances, which in turn decay until becoming a stable element.

Radium can enter the body through breathing or swallowing. It will gradually be carried throughout the body, especially to the bones.

Exposure to it over a long time period can result in anemia, cataracts, fractured teeth, cancer and death. The greater the exposure, the more likely it is that a person will experience one of the adverse health effects.

Radon

Colorless, odorless and tasteless, radon is a radioactive gas formed by the decay of uranium. It has a half-life of about four days.

Exposure can be by breathing in or swallowing the radon, but breathing in the gas is by far the more common way.

Long-term exposure to radon increases the risk of lung cancer.

Noncancer diseases of the lungs also can occur. Smoking can increase the risks.

Selenium

Selenium can be found in photographic devices, plastics, paints, vitamin and mineral supplements and more. It can enter the air through the burning of coal or oil.

Most of the selenium that enters the body leaves quickly, but it can build up in the body if exposures are high or occur over a long period. It can build up in the liver, kidneys, blood, lungs, heart, testes, skin and nails.

Dizziness, fatigue and irritation of mucous membranes can occur with exposure to high concentrations.

Tetrachloroethene

At one time tetrachloroethene was used in chemical manufacture, but its use has diminished.

Breathing the fumes can cause fatigue, vomiting, dizziness and loss of consciousness, but the symptoms usually diminish after breathing fresh air.

The health effects from long-term exposure to small levels of the substance are not known. The EPA considers it a possible human carcinogen, although the International Agency for Research on Cancer does not consider it to be.

Thorium

Thorium is a naturally occurring radioactive metal. It decays into a series of new substances, including radium and radon.

It is used to make ceramics, lantern mantles and in metals used in the nuclear and aerospace industries.

People are exposed to a small amount of thorium in air, food and water, but those near sites where thorium was not properly disposed of may be exposed to much higher levels.

Breathing in thorium dust can increase the chance of lung cancer or other lung diseases.

The substance can be stored in the bones, so bone cancer is also a concern.

Uranium

A natural and commonly occurring radioactive element, uranium can take as long as 4.5 billion years to decay.

The radioactivity levels change in uranium exposed to water, resulting either in enriched uranium that is more radioactive or depleted uranium, which is less radioactive.

The main uses of uranium are for nuclear power plants, on helicopters and airplanes, and as shielding for Army tanks.

Root vegetables grown in soil that contains uranium can contain more uranium themselves, but washing the vegetable or peeling it often removes all or most of the uranium.

When people ingest uranium in food and water it leaves their bodies within a few days. A small portion can stay in bones, kidneys and soft tissues.

When people inhale uranium particles, the size of the particles can influence where it goes. Larger particles can become stuck in the lungs. Smaller ones move from the lungs into the bloodstream, where most will be carried through the body and out in the urine. A small amount can stay in the kidneys and bones.

The chance of developing cancer is greater if a person is exposed to enriched uranium than if the exposure is to natural or depleted versions.

The Committee on Biological Effects of Ionizing Radiation used animal studies to estimate that people who eat food or drink water with larger-than-normal amounts of uranium could develop the bone cancer known as sarcoma.

Kidney disease is another potential health problem.

Zinc

Zinc, like copper, is found in the common penny. It also can be found in sunblock, deodorant and antidandruff shampoo.

A deficiency of zinc can cause health problems such as lower disease resistance and reproductive problems.

However, too much zinc can cause stomach irritation in the short-term, and can damage the pancreas or cause anemia in the long-term.

Information on health risks associated with most of these substances listed in this article came from the Agency for Toxic Substances and Disease Registry, which has developed toxicological profiles of hazardous substances that exist at the country's Superfund sites.

Information on molybdenum came from the Environmental Protection Agency. Information on iron came from the Iron Overload Diseases Association.

For more detailed information about any of the 261 substances for which the ATSDR has written profiles, visit the agency's Web site at www.atsdr.cdc.gov/toxpro2.html#-A.

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