

Tailings ponds for mining and oilsands waste: FAQs

What's in them, what makes them risky and how they're regulated

CBC News Posted: Aug 05, 2014 12:21 PM ET | Last Updated: Aug 10, 2014 11:00 PM ET



The breach of a tailings pond at the Mount Polley copper and gold mine in B.C. has released five million cubic metres of mining wastewater into local waterways. (Cariboo Regional District)

The breach of a tailings pond at the Mount Polley copper and gold mine in B.C. has released 10 billion litres of mining wastewater into local waterways in early August. Local residents have been banned from using the water from the Quesnel and Cariboo river systems.

Here are the answers to some questions you might have about tailings ponds.

What are tailings?

Tailings are the byproducts left over from mining and extracting resources, such as extracting bitumen from the oilsands or minerals such as copper or gold from ores. Tailings include:

- Finely ground rock particles – ranging from sand-sized to silt-sized.

- Chemicals used to extract the valuable mineral or oil.
- Water.

The rock particles and other chemicals may undergo chemical reactions during storage that generate additional byproducts, such as acid and other dissolved metals that can more easily leach into waterways. These reactions happen unusually quickly in tailings because small particles have a very high surface area where reactions can take place, compared to bigger particles.

Many substances found in tailings can be toxic.

What is a tailings pond?

A tailings pond is a wet storage area for tailings that allows them to be continuously submerged. (Some tailings can also be stored under "dry covers" such as soil.)

The technical name for a tailings pond or other storage site is a "tailings impoundment area."

How is a tailings pond built?

Natural Resources Canada describes tailings ponds as "engineered structures" created through the use of dams, berms, and "natural features such as valleys, hillsides or depressions."

However, under a change made to the federal Metal Mining Effluent Regulation of the Fisheries Act in 2002, natural water bodies such as lakes can also be re-classified as a tailings impoundment area and used to store tailings.

What kinds of substances are found in tailings ponds?

The substances found in tailings ponds depend on the type of mining operation.

Last year, [**Imperial Metals Corp. reported that tailings from its Mount Polley copper-gold mine**](#) contained thousands of tonnes of copper, zinc, phosphorus and manganese along with:

- 138 tonnes of cobalt.
- 71 tonnes of nickel.
- 3.6 tonnes of antimony.
- 84,831 kilograms of arsenic.
- 38,218 kilograms of lead.
- 8,695 kilograms of selenium.
- 562 kilograms of mercury.
- 995 kilograms of cadmium.

Tailings from oilsands can contain naphthenic acids, polycyclic aromatic hydrocarbons, phenolic compounds, ammonia, lead, mercury, and other metals.

How much volume is stored in tailing ponds?

Tailings lakes from Alberta's oilsands alone covered 176 square kilometres in 2010, according to the non-profit environmental think-tank The Pembina Institute.

At the Mount Polley copper gold mine, five million cubic metres of effluent – enough to fill 2,000 Olympic-sized swimming pools – were released into Hazeltine Creek this week

What are the environmental risks posed by tailings ponds?

Damage to tailings ponds can cause them to release large volumes of their toxic contents into the environment. That is what happened at Mount Polley.

Tailings ponds can also leak gradually. A new federal study released earlier this year found evidence that strongly suggested that the [contents of Alberta's tailing ponds are seeping into the Athabasca River](#). The study found oilsands compounds with chemical signatures matching the tailings ponds in upward flowing groundwater less than a metre below the river.

Encounters between wildlife and tailings ponds can also be hazardous. Waterfowl that land on oilsands tailings ponds can become coated in oil, causing them to sink to the bottom. In 2010, a study estimated that [about 2,000 birds die per year in Alberta oilsands tailings ponds](#). That year, oilsands company Syncrude paid a \$3-million fine for the deaths of [1,600 ducks at one of its tailings ponds](#) in 2008.

In 2012, an anti-nuclear activist expressed concerns about a [caribou seen taking a dip in the tailings pond of a Saskatchewan uranium mine](#), which contained radioactive waste and heavy metals.

A number of environmental groups such as the David Suzuki Foundation and Mining Watch Canada have also criticized the conversion of pristine lakes into tailings ponds, killing off fish and wildlife and turning them into "dead zones."

How do mining companies minimize these risks?

Tailings ponds must be designed to minimize interactions between tailings and the local environment to prevent acid generation, metal leaching, and contamination of surface water and groundwater, Natural Resources Canada says.

Mine operators may also remove water to thicken tailings and remove sulphur from tailings to reduce their tendency to generate acid.

Noise cannons are used to scare ducks and other waterfowl away from tailings ponds.

How are tailings ponds regulated?

Responsibility for regulation of tailings ponds is shared by federal, provincial and territorial governments. They are typically a key component in environmental assessments when mines are proposed.

Federal government departments are responsible for tailings if they involve:

- Uranium (Canadian Nuclear Safety Commission).
- Navigable waters (Transport Canada).
- Fish bearing waters and fisheries (Fisheries and Oceans Canada and Environment Canada).
- Environmental matters of international and inter-provincial concern (Environment Canada).
- Federal lands.