Using heat to beat toxins

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Researchers have developed a promising way to cleanse the environment of volatile organic compounds (VOCs) – some of the most insidious toxins known to humans.

Instead of digging polluted subsoil and transporting it to treatment plants, the new technology heats the contaminated areas and releases the toxic chemicals, which are then extracted from the ground and destroyed.

This may be a cheaper and safer way to clean up contaminated soil and groundwater – and make our cities healthier – Dr Gorm Heron of TerraTherm Inc. will tell the CleanUp 2013 conference in Melbourne today.

"VOCs are toxic chemicals that come from paints, cleaning fluids, pesticides, building materials, oil and fuel," Dr Heron explains. "They exist as gases and liquids, pollute air, soil and water, and are linked to cancer and other chronic diseases, including liver and kidney damage."

Massive amounts of these toxins are found in soil and groundwater near landfills, oil refineries and chemical factories, Dr Heron says: "The toxins have often been there since the 60s and 70s – people then were unaware of the danger of VOCs and poured or buried their chemical waste in the ground.

"As a result, these places contain extremely high concentrations of the most poisonous chemicals. The toxins contaminate the environment in multiple ways – they leach out of waste dumps and burial pits and

pollute soil and groundwater whenever it rains. They may then pollute vegetables and other foods grown using the groundwater."

The toxins also seep into houses and offices that are built on top of the contaminated soil, Dr Heron says.

The current way to clean up contaminated soil from chemical and landfills is to dig them from the ground and transport them to treatment plants. They are then burned and broken down into less toxic molecules, Dr Heron explains.

"However, this is very expensive and intrusive because it causes smells, dust, and the risk of releasing even more VOCs into the air," he says. "It is also very disruptive to surrounding houses as trucks come in and out to transport the soil.

"Another way is to set up mobile plants directly on the contaminated site and burn the soil there, but that is also expensive, dirty and laborious."

Dr Heron and his colleagues have developed a better way to clean up the polluted soil. "Our technology involves heating up the underground directly – we heat up the subsurface until the toxins vaporise from the soil and groundwater.

"Once they're released, we suck them to the surface and burn them, turning them into carbon dioxide and water, or we trap them in containers using charcoal."

The team has successfully tested the technology on soils from a site in Victoria, he says. "We've also used it to clean up over 200 sites worldwide and have achieved great results. There are thousands of these sites in Australia and we see vast potential in using this technology to clean the polluted soil."

"Whether it's done above or below ground, using heat to treat contaminated soil and groundwater is never cheap," says Dr Heron. "This is because we're dealing with large amounts of the worst chemicals.

"However our technology can be cheaper and safer than conventional methods because the entire set up is underground. This is less intrusive, less laborious and we don't risk exposing the environment to more VOCs."

Dr Heron will deliver his presentation at 8.30am, Tuesday 17 September.

More information: www.cleanupconference.com/

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