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Can blockchain pave the way for ethical cobalt?

by Jordan Teicher

Benoit Nemery, a professor of toxicology at the Belgian university K.U. Leuven, has long been involved, together with researchers from the University of Lubumbashi, in investigating the "collateral damage" caused by mining activities in the copper-cobalt belt in the Democratic Republic of Congo.

"It's very chaotic, very dirty, and very obviously polluted," he said.

Since 2006, he's visited the country—one of the world's poorest—annually in an effort to better understand the health effects of cobalt exposure among those who live around mines and metal processing industries. But when he arrived in Kolwezi, the heart of the Congolese mining region, on a 2014 trip, the conditions were unlike anything he and his local colleagues had ever seen before.

Just a few months earlier, a man had discovered cobalt ore, or heterogenite, in the middle of Kolwezi's working-class Kasulo neighborhood. Soon, amateur prospectors, or "creuseurs," descended on the area with hand shovels and pickaxes and began their own small-scale "artisanal" mining operations.

"We'd seen artisanal mining in many places but never in the way we'd see in Kasulo. It was spectacular and tragic, really," Nemery said. "I have pictures where you can see everything had been turned over. There were pits 20 meters deep, and a lot of rubble everywhere, and children playing around in it. Some people were keeping the minerals in their own homes."

Over two brief surveys, in 2014 and 2015, Nemery and his colleagues took biological samples of dozens of cobalt workers and Kasulo residents, including many children. The results, which were published in Nature Sustainability this September, were disturbing. Concentrations of cobalt and accompanying trace metals in the urine of those tested were, he said, "among the highest we've ever seen." According to the National Institute for Occupational Safety and Health in the United States, cobalt exposure can harm the eyes, skin, heart, and lungs, and may even lead to cancer.

Officials have since cracked down on artisanal mining in Kasulo, but the practice continues throughout the country. Today, the DRC remains the world's biggest supplier of the metal, a crucial component in lithium-ion batteries that power a wide range of products including smartphones, laptops, and electric cars. According to a report from Morgan Stanley, cobalt demand is expected to multiply eightfold by 2026.

But while many companies source their cobalt from safer, large-scale industrial mines, there's currently no surefire way for companies to prove it to customers, since cobalt, when smelted, is regularly combined with metals from a variety of sources.

"Everybody wants to make sure the products they're using don't contribute to worker violations or promote

child labor. There's an incentive for companies to prove that their products are ethically sourced," said Max Nelson, a Global Business Development Executive for Industrial Products with IBM Global Markets.

Today, a consortium comprising Ford Motor Company, Huayou Cobalt, IBM, LG Chem and RCS Global is working on a way for companies to finally offer that proof to customers. Together, they're working on a first of its kind pilot to demonstrate how materials in the cobalt supply chain can be responsibly produced, traded and processed from mine to end manufacturer. The key to the program is blockchain.

"What differentiates this program is the transparency, the trust, and the security that this platform is built on," Nelson said.

The pilot, which began in December with oversight from responsible sourcing group RSCS Global, starts at Huayou's industrial mine site in the Democratic Republic of Congo. The cobalt produced there is traced through the supply chain as it travels from mine and smelter to LG Chem's cathode and battery plant in South Korea, and finally to a Ford plant in the United States. The result is an immutable audit trail, created on the IBM Blockchain Platform and powered by the Linux Foundation's Hyperledger Fabric, that can be seen by all permissioned network participants in real time.

"At IBM, we're organized across 12 different industries, so we have the industry knowledge and leadership to bring this together. That's how we've been successful in bringing in participants across the supply chain," Nelson said. "We think original equipment manufacturers, aerospace and defense

companies, and all these industries across the supply chain will be encouraged to join this platform upon completion of this pilot."

While the initial focus of the program is large-scale miners, or LSMs, Nelson said the group wants to ultimately expand the initiative to include the kinds of small-scale operations Nemery visited in Kolwezi. If those miners meet internationally ratified responsibility requirements, Nelson said, the consortium stands ready to help them partner with due diligence data providers and, ultimately, join the blockchain network.

"The broader purpose of the network is to make a true positive social impact and help address the root causes of the challenges faced by the artisan miners," Nelson said.

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