

MERCURY RISING

THE USE OF MERCURY IN ARTISANAL MINES IS POSING SERIOUS ENVIRONMENTAL AND HUMAN HEALTH RISKS. MARCELLO VEIGA IS AIMING TO INTRODUCE GLOBAL STANDARDS TO REGULATE ITS USE



Photos > Marcello Veiga

Around the world, the ever-rising price of gold has produced the largest gold rush in history. Approximately one-third of the world's gold supply comes from artisanal mines that are too small to be of interest to large mining companies, but which present an irresistible draw to millions of poor and itinerant workers.

These myriad mines directly and indirectly employ 50 to 100 million people worldwide and collectively produce 600 to 800 tonnes of gold each year. They are a key economic activity for hundreds of communities in more than 70 countries, but the pervasive and unregulated use of mercury—a potent neurotoxin and a key ingredient in gold refining—is posing a serious risk to human health and the environment.

“Liquid mercury is mixed with a slurry of gold ore to form a solid alloy called an amalgam,” says Dr. Marcello Veiga, an Associate Professor at UBC Vancouver's Department of Mining Engineering. “This alloy is then heated with an open flame, either in the field or in a gold shop, to evaporate the mercury and leave behind a gold nugget. In the absence of environmental regulations or best practices, much of the waste mercury ends up in the air or in the local water supply—or in the lungs of miners and community members.”

Mercury's affordability, availability and ease of use have made amalgamation a widespread practice in artisanal mines around the world. Most miners are not aware of the health risks, which are

greatest when the amalgam is heated without protective equipment, releasing mercury vapours that are toxic when inhaled. Mercury released to the environment can be transformed into deadly methylmercury, to be bioaccumulated in fish.

Intervention in Indonesia

Since 2005, Veiga has directed the Global Mercury Project (GMP) at UBC, a collaboration between the UBC Department of Mining Engineering and the United Nations Industrial Development Organization (UNIDO). Artisanal mining accounts for about one-third (1,000 tonnes/yr) of global mercury consumption, and Veiga estimates that a further one-third of this occurs in Asia—particularly in Indonesia, which is the second-largest artisanal gold mining nation in the world, employing as many as 400,000 miners.

“We have serious humanitarian concerns about the use of natural resources without regard for the environment,” Veiga notes. “We are not only fighting mercury here; we are fighting hunger and poverty too. Our research involves a lot of people from many disciplines.”

Using satellite imagery provided by Dr. Kevin Telmer of the University of Victoria, Veiga selected three key Indonesian sites that posed the greatest threat to the local environment. He then coordinated an extensive program of education and technology transfer that involved an interdisciplinary team of engineers,

educators and anthropologists. Veiga and his team provided basic technologies and training to over 1,000 members of government and the mining community. They also launched a public awareness campaign involving radio and TV programs, booklets, brochures, posters, school visits and newspaper articles.

“We installed 38 fume hoods in the gold buyers' shops so that they could burn amalgams without polluting the air or inhaling the toxic mercury vapours,” Veiga says. “In some shops, we recovered as much as 90 per cent of the mercury from the amalgam. We estimate that these filters will prevent the release of about 900 kilograms of mercury into the air through 2008.”

The first phase of the Global Mercury Project concluded in December 2007 and focused on artisanal gold mining practices in Brazil, Tanzania, Zimbabwe, Sudan, Laos and Indonesia. Veiga is currently working with Indonesian authorities to replace mercury with cyanide, a cheaper and less toxic alternative to mercury that recovers a higher percentage of amalgamated gold. He is also working to introduce formal legal standards requiring the use of proper fume hoods in Indonesian gold shops. ■

Dr. Marcello Veiga's research is funded in part by grants from the Natural Sciences and Engineering Research Council of Canada (NSERC). The Global Mercury Project is funded by UNIDO.