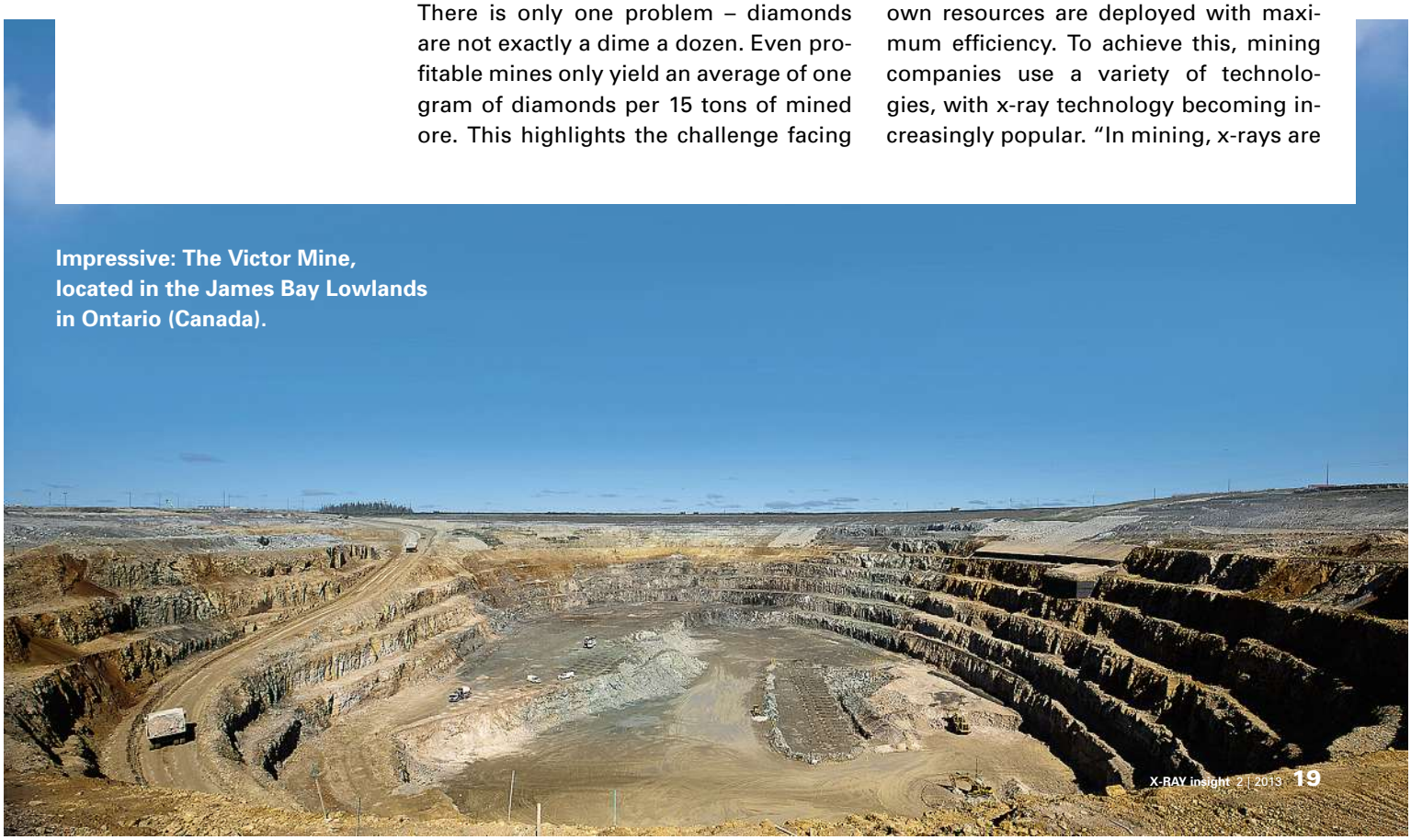
Mining

A modern-day treasure hunt

As Marilyn Monroe famously sang in the 1950s, **“Diamonds are a girl’s best friend”.** In the 21st century, the song title remains as relevant as ever. More than ever, yields as close as possible to 100% and high levels of process efficiency matter in today’s mining industry.

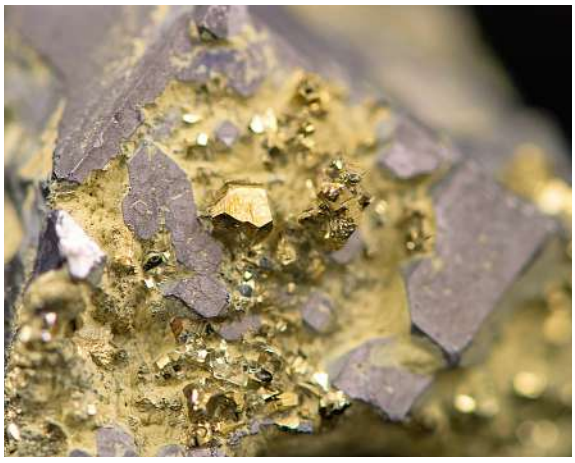
Precious stones are still highly coveted. While particularly large and pure stones continue to command record prices at auctions, smaller examples can still make people’s eyes light up with joy.

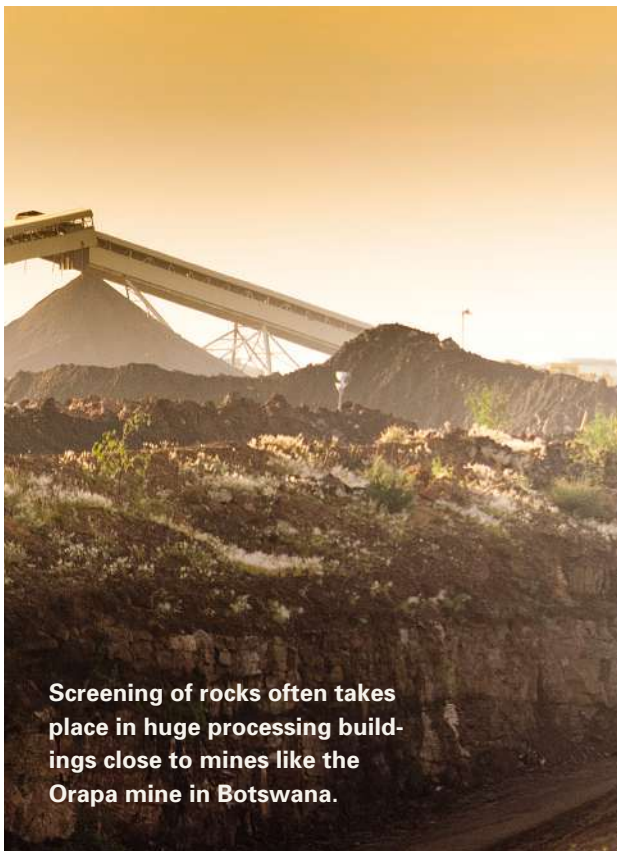
There is only one problem – diamonds are not exactly a dime a dozen. Even profitable mines only yield an average of one gram of diamonds per 15 tons of mined ore. This highlights the challenge facing mine owners every day: they have to ensure that even the smallest stones are procured in the forbidding mine environment and that yields are as close to 100% as possible, all the while ensuring their own resources are deployed with maximum efficiency. To achieve this, mining companies use a variety of technologies, with x-ray technology becoming increasingly popular. “In mining, x-rays are



Impressive: The Victor Mine, located in the James Bay Lowlands in Ontario (Canada).

Don Brennan: "Our customers use x-rays to increase their process efficiency when mining rare, valuable minerals. This applies in particular to gold and rough diamonds."





Screening of rocks often takes place in huge processing buildings close to mines like the Orapa mine in Botswana.

very effective and efficient," says Don Brennan, Vice President Business Development & Sales at COMET Industrial X-Ray. "While x-rays are an expensive method, they have an above-average price/performance ratio. Our customers can significantly increase their process efficiency using x-rays, especially when mining rare minerals that are only found in small quantities – and are thus more valuable. This applies in particular to gold nuggets and diamonds."

Customized COMET products

Thanks to its years of experience in x-ray technology and its wide range of products, COMET is also an ideal partner to

Industrial X-Ray – four approaches

The most common method used in mines is **X-Ray Transmission,** a highly efficient approach used to detect precious stones and ore on the basis of their differing densities. It is mainly used to analyze large quantities of material and highly valuable ores. X-Ray Transmission can also be combined with **X-Ray Luminescence,** which increases yields at diamond mines even further. X-Ray Luminescence exploits the fact that even the smallest impurities cause diamonds to glow when exposed to x-rays. Until now, **X-Ray Fluorescence** and **X-Ray Diffraction** have generally been used for smaller quantities of material and in laboratory work only. X-Ray Fluorescence enables ore to be differentiated through its spectrography. X-Ray Diffraction, meanwhile, completely analyzes the material – which poses enormous challenges where quantities are large.

X-rays in the mining industry

The use of x-rays in the mining industry has a long tradition. For many years, miners were x-rayed as they left the mine as owners wanted to prevent their workers from smuggling diamonds out by swallowing them. Nowadays, such fears are mostly unfounded. Current mining systems are designed so that most workers no longer come into contact with the actual diamonds, thereby eliminating temptation. X-ray technology is now used with increasing frequency to detect diamonds, gold and other valuable materials.

the mining industry. "We offer a variety of options," comments Don Brennan. "We can then customize the products according to the individual requirements of our customers, enabling us to build ideal x-ray sources. If we are involved in a new project from the outset, we can utilize the full potential to the greater benefit of our customers."

Outstanding success rates when searching for precious metals and ore

This is the driving principle behind COMET. The development of specific solutions is a central aspect in discussions with customers. "We develop our products at the R&D Center in Flamatt and react quickly thanks to short processing routes and the best possible infrastructure. Tailored solutions and small production runs also mean reliable, high-quality systems for our customers in the mining industry." Among other aspects, Industrial X-Ray achieves this thanks to very high success rates when searching for precious metals or ore. What's more, mining companies are now checking and scanning earth and excavated material considered worthless some years ago for a second time – and discovering valuable materials that were previously overlooked. One key aspect in enhancing process efficiency is 'sorting in the field', whereby screening systems are used at mines to analyze stones or mined ore, leading to a significant reduction in transport costs. Waste material is often a major problem, as this must be taken away and disposed of. With this in mind, Don Brennan notes that the machines are often used in extremely harsh environments and that the mines are usually found in the remotest corners of the world. "This means that customers have particularly stringent demands. They have to be able to count on the x-ray sources working reliably on a long-term basis, as replacements are not usually available at short notice."

"In mining, x-rays are very effective and efficient."

Don Brennan, VP Business Development & Sales, COMET IXT