**TOMRA’s XRT technology: a game-changer at Letšeng Diamond Mine in Lesotho**

*TOMRA’S XRT sensor-based sorting technology unlocks significant value for Gem Diamonds at its Letšeng Diamond Mine. It delivered an effective solution for coarse fractions in historical tailings dumps, recovering 15 times the initial investment in 4 years. This success has led to the installation of the first TOMRA Final Recovery sorter in the world, now in its final commissioning stage. Projects to further upgrade the mine’s Recovery Plant with more TOMRA XRT sorters are in the pipeline.*

Gem Diamonds, a leading global diamond producer of large high value diamonds, owns 70% of the Letšeng mine, located in the Maluti Mountains of Lesotho. It is one of the largest open pit diamond mines in the world, it processes ore from two kimberlite pipes – the Main pipe (17.0ha) and the Satellite pipe (5.2ha) – and is known for the recovery of Type II diamonds. The ore is treated through two plants with conventional crushing, scrubbing, screening and Dense Medium Separation (DMS) processes. The DMS concentrate is split into three fractions that are sent to be processed with XRT (X-Ray Transmission) and XRF (X-Ray Fluorescence) technologies.

In 2017, the company undertook several activities to unlock the mine’s full potential and contacted TOMRA Mining to explore ways of improving its Coarse Recovery process.

**A trial of TOMRA’s XRT technology quickly reveals its potential**

Jaco Houman, Senior Manager Technical and Projects at Gem Diamond Technical Services, explains: “We had quite a lot of historic tailings material. We had a view that, since we had commissioned a new Coarse Recovery in 2015, we weren’t quite getting all the diamonds we were looking for. We worked with our supplier to improve, but we felt we had reached a ceiling point. That’s when we decided to augment the installed base and contacted TOMRA.”

Gem Diamonds rented a TOMRA COM Tertiary XRT sorter, which was deployed in the second half of 2017 to process historic tailings. “Our objectives were to audit the Coarse Recovery Plant performance, increase diamond recovery, improve the recovered revenue and evaluate the TOMRA unit as a recovery and bulk sorting unit,” says Jaco Houman.

The initiative was a success and the TOMRA sorter delivered on all the objectives Gem Diamonds had set: “During the 6-month rental of this unit, we got a better understanding of our primary recovery efficiencies, we were able to conduct off-line auditing and scavenging activities, we increased our diamond recovery and revenue, and we effectively introduced bulk treatment of historical recovery tailings.”

TOMRA’s XRT sorter exceeded all expectations: “The unit showed that it recovers consistently from the tailings material. The value that came from it spoke volumes about the technology and the potential that could still be obtained with the material available. It cemented the realisation that we needed a recovery unit for scavenging, auditing and second-pass recovery.”

**High Value Recoveries and excellent ROI with TOMRA COM XRT 2.0 sorter**

On the back of the excellent results achieved with the rental unit, Gem Diamonds purchased a TOMRA COM XRT 2.0 sorter to replace the rental unit at the end of the contract. Featuring a bigger ejection chamber, higher belt speed and throughput, this unit was perfectly suited to the large diamond recovery set up the company was looking for, and they didn’t have to wait for it to deliver:

“In January 2018, we had pretty much just finished commissioning this unit and we recovered the biggest stone Letseng had ever seen, the 910-carat Lesotho Legend. There was no question about performance after that,” says Jaco Houman. “Since 2017, we have recovered 6 diamonds that were sold for more than 1 million US$ with the two TOMRA XRT sorters.”

Since installing the TOMRA COM XRT 2.0, the mine’s +5mm historic material has been depleted and the company is now focusing on scavenging and auditing the existent tailings. Jaco Houman explains: “About 10 tonnes a day of coarse fractions are stockpiled per export period, and we do roughly 8 exports a year. Over an average of about 45 days, we accumulate 450 to 500 tonnes, which we process at the end of the export period. We are seeking confirmation that all economical value has been recovered and that nothing has been missed in our recovery process. By having this unit in place, we are now able to recover all the diamonds that are present in our concentrate, either through a first or a second pass.”

With its performance, the TOMRA COM XRT 2.0 sorter has more than paid for itself, as Jaco Houman points out: “To date, we have recovered about 15 times the investment value over the 4 years it has been in operation.”

**Gem Diamonds purchases the first TOMRA XRT Final Recovery sorter in the world**

Gem Diamonds has been so impressed with TOMRA’s XRT technology that they have become early adopters of its ground-breaking Final Recovery solution, purchasing a TOMRA COM XRT 300 /FR sorter before it was even launched, so that the Letšeng mine is home to the first unit to be installed in the world.

Having found an effective solution for Coarse Recovery with the TOMRA COM XRT 2.0 sorter, Gem Diamonds turned their attention to the Fines Recovery Circuit. “We sent some samples for testing to an independent facility and our assumptions of under-recovery in certain size fractions were confirmed,” says Jaco Houman. “We wanted to find a solution to increase our revenue from the treatment of historic material. We were looking for a compact machine we could use as a final recovery sorter, and the TOMRA COM XRT 300 /FR performs very well in that duty, or even as a single particle sorter. Also, it is a sorter that will treat a super-concentrate and work very well as a scavenging unit.”

“The diamond industry had been waiting for 20 years for a way to introduce XRT directly into the Diamond Final Recovery instead of the bulk concentration stages where the DMS modules exist,” explains Ryan Szabo, Sales and Project Manager Diamonds at TOMRA Mining. “The TOMRA COM XRT 300 /FR is a compact sorter that can function within the diamond recovery and sort house environment, and it is the first to accurately sort diamonds based on their properties and not their proxies, achieving market leading recovery with the highest recovery factor to date. This made it ideal for Gem Diamonds’ requirements at the Letšeng mine.”

TOMRA’s Final Recovery sorter is now in the commissioning stage, and performing well, as Jaco Houman states: “We are getting consistent recovery from the TOMRA COM XRT 300 /FR, which is performing to our expectations from this perspective. The overall throughput has not been attained due to deficiencies in the drying system upstream, which are making feeding the sorter at higher throughput rates difficult. However, design corrections are in the process of being implemented and I am confident that we will be able to demonstrate performance of the Final Recovery sorter at the higher capacities.”

“The Final Recovery sorter has functioned exceptionally well,” adds Ryan Szabo. “To date the sorter has never failed a performance test at the Letšeng Diamond Mine. It has already had successful results in the commissioning stage. In fact, it’s the most successful first implementation of a new solution that TOMRA has ever had.”

The installation of the TOMRA COM XRT 300 /FR is the first in a series of three projects that Gem Diamonds is planning in order to upgrade its Recovery Plant with the addition of further TOMRA XRT sorters. The company is also working on a project for the construction of a second recovery circuit that would combine the TOMRA COM XRT 2.0 sorter currently on site, a new TOMRA COM Tertiary sorter and a COM XRT 300 /FR sorter to create an off-line scavenging facility. This will be followed by a third project, which will look at implementing TOMRA XRT technology through the remainder of the Final Recovery.

**TOMRA: invested in the client’s success**

The last four years have seen the successful introduction of TOMRA’s XRT technology at the Letšeng Diamond Mine, where it has provided effective solutions in different stages of the process, improving the operation’s profitability and efficiency. For Jaco Houman, this success stems not only from the advanced technology, but also from TOMRA’s approach to serving its customers: “What I like about TOMRA, is that for them it’s not just about selling you a piece of equipment. If the equipment doesn’t work in the solution or the system that you want, they’d walk away from the sale. For me, this testifies to the fact that they have a vested interest in the success of your business.”

The support that TOMRA has provided throughout the projects also stands out: “My experience has only been positive. We’re dealing with an organisation with experienced, professional people. I can see that they love what they do, they’re very diligent in their work. The technical people on site have spent hours and hours not just setting up the equipment, but also imparting knowledge and getting the operational staff up to the required levels, so that when they walk away, we know that there’s going to be continuity. I believe that when TOMRA makes a commitment , you can bank on the fact that they will deliver on that.”

**About TOMRA Mining**

TOMRA Mining designs and manufactures sensor-based sorting technologies for the global mineral processing and mining industries.

As the world market leader in sensor-based ore sorting, TOMRA is responsible for developing and engineering cutting-edge technology made to withstand harsh mining environments. TOMRA maintains its rigorous focus on quality and future-oriented thinking with technology tailor-made for mining.

**About TOMRA**

TOMRA was founded on an innovation in 1972 that began with the design, manufacturing and sale of reverse vending machines (RVMs) for automated collection of used beverage containers. Today TOMRA provides technology-led solutions that enable the circular economy with advanced collection and sorting systems that optimize resource recovery and minimize waste in the food, recycling and, mining industries and is committed to building a more sustainable future.

TOMRA has ~100,000 installations in over 80 markets worldwide and had total revenues of ~9.9 billion NOK in 2020. The Group employs ~4,300 globally and is publicly listed on the Oslo Stock Exchange (OSE: TOM). For further information about TOMRA, please see www.tomra.com

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