Challenging Times or the Age of Innovation?

Both of course; or as Dickens said, it is the ‘best of times, it is the worst of times’. Necessity was always the mother of invention.

The industry recognises we ‘took our eye off the ball’ of productivity during the boom, in the understandable push for production. Now the emphasis has swung back to improving productivity. To deliver on promises, to squeeze more from existing assets, to increase efficiency.

We know that some will make some mistakes. They will cut too deep on maintenance and innovation. They won’t recruit the next generation. They will get short term results, but will miss the next upswing. Whereas the smart operators will certainly cut costs, but with an eye to long term capability. They will seize the opportunity to redirect their best minds from a focus on increased production to innovations in efficiency.

WHERE TO FIND THOSE GAINS?

One of the most promising areas to make gains is ‘between the silos’ in processing. We all know that the best place to solve the smelting problem is the concentrator; the best place to solve the concentrator problem is the mine. One dollar spent upstream can save $10 downstream. We know this, but as an industry we still don’t do it well. Sometimes because we don’t talk enough between business units. Or because another company owns ‘downstream’. Sometimes our KPI’s lock in a focus on our own cost per tonne rather than the stream cost. Or, most likely, we have simply been too busy doing our own job during the boom.

Now is the time to find these productivity gains. Apply mineralogical understanding to help select, blend and schedule ores. Use modern techniques to simplify our concentrators. Improve smelting, leaching and refining by first improving feed quality and stability; then further stabilising and optimising the process. Apply appropriate process control – which is much simpler when the feed is steadier and the plant simpler.

USE OUR EXPERTISE IN TECHNOLOGY

XT has consistently demonstrated powerful circuits – whether it is making much higher quality concentrate with less equipment, retrofitting parts of a smelter to improve the emission control, or recovering metal from refractory ores. XT specialists work closely together across all the disciplines, from ore mineralogy to final metal refining. Like many of our clients, we constantly see huge opportunities to increase whole-stream productivity; so much easier than trying to squeeze small gains out of each individual ‘silos’. We know this is easier said than done in a big organization. But it is worth doing, and it is what we do.
XT now has an office in Moscow. Officially opened in November last year, with attendees from major Russian mining companies, it was opened by the Australian Ambassador, Paul Myler, who highlighted the vast potential for innovative Australian mining technologies such as XT’s on the CIS market.

The Moscow office is supported by Anna Petrova – Regional Manager Russia and CIS, and Rakan Rahbani – European Manager for XT’s mineral processing division, with further support carried out through XT’s offices in Australia and Vancouver. Both Anya and Rakan are experienced metallurgists, who have been working with a number of companies looking at improving their mineral processing flowsheets in base metals and coal operations across Russia and CIS countries.

Lindsay Clark, GM – Mineral Processing at XT, said XT recognised the importance of Russia and the CIS regions in the production of the world’s minerals and metals, as well as the exciting future projects and expansions that were occurring in these regions.

“We have been working in the region for some time, from our very first IsaMill™ in Kyrgyzstan Republic back in 2004, to other recent IsaMill™ and Jameson Cell projects in Russia and Kazakhstan.

We have also been involved with the Saint-Petersburg Mining Institute (SPMI), as well as installing small scale IsaMill™ testing equipment at TOMS in Irkutsk and Jameson Cell testing equipment at SibNlugleobogaschenie, coal institute in Siberia. These units will enable our clients to do testwork closer to their project rather than sending samples overseas which can be time consuming.”

Official opening of L150 Jameson Cell at SibNili, Russia for coal testing – go to: www.youtube.com/watch?v=NS_pHvV6EOo

Refining Copper in Zambia

XT has been working on one of its largest copper refinery conversion projects to date, the modernisation of Glencore’s Mufulira Copper Refinery, in Zambia.

Brendan O’Rourke, XT Refinery Projects Manager, said the project will be the largest to be using the Duplex stainless steel cathode plates, which have become well regarded in electro refining and winning of copper, due to their superior mechanical and corrosion resistance properties. This means the cathode plates have better flexing performance in the cathode striping operation, without permanent deformation to the cathode plate blade, which ultimately results in longer cathode plate life. Brendan said part of the modernisation will involve the installation and commissioning of 3 stripping machines, 1 anode washing machine, and a scrap handling machine, as well as over forty-eight thousand plates, which will be replacing the existing starter sheet operation with manual stripping. XT will also supply SCADA based process control technology and the CellView® Cell Voltage Monitoring System. Annual copper output is designed to be 220 KT of LME Grade A copper per year.

XT has had a good relationship with the Mufulira operation over many years, with one of the largest ISASMELT™ Copper Smelters already operating at the site.
Lead ISASMELT™ Commissioned at Huize Smelter, China

Chihong Zinc and Germanium Co. Ltd have recently commissioned their second ISASMELT™ furnace.

The first ISASMELT™ furnace built by Chihong has been operating successfully for nine years and is a key element of the integrated metallurgical facility at Qujing, Yunnan province, in the People’s Republic of China. With the success of this installation, Chihong decided to install a second ISASMELT™ furnace at another site near the town of Huize, also in Yunnan province, in the People’s Republic of China.

The plant was designed to treat 160,000 t/y of lead concentrates sourced from local mines. In December 2013, the lead smelter was commissioned, and the production is now ramping up.

XT’s commissioning manager, Alistair Burrows, said that, “Chihong have done a fine job with the construction of this plant and their integration of the ISASMELT™ into their smelting flowsheet.” About 40% of the lead bullion is tapped from the ISASMELT™ furnace into moulds on a casting wheel. Molten transfer of lead-rich slag from the ISASMELT™ into a stationary reduction furnace allows the remainder of the lead bullion to be recovered. First lead from the plant was produced on 7th of December.

XT has been working with the Chihong group for a number of years, with their Quijing operation being the first installation to implement the patented ISASMELT™ TSL-Blast Furnace Process for the production of lead bullion. This process uses an ISASMELT™ to replace the sintering stage to produce a glassy slag designed for treatment through the blast furnace. This development was in contrast to conventional thinking at the time, where the sinter feed to the blast furnace needed to be porous in nature. This breakthrough development has enabled the ISASMELT™ to replace sinter machines, enabling better sulphur capture in the process, as well as able to produce up to 70% of the bullion prior to the blast furnace. It is operating at the Qujing site and Kazzinc’s Ust-Kamesogorsk lead smelting operation.
Albion in Armenia – Transforming Economics of Refractory Gold

XT is overseeing the commissioning of GPM Gold’s Albion Process™ plant at Ararat in western Armenia. The plant is designed to oxidise a refractory gold concentrate produced at site from ore recovered from the Zod Gold Mine, located on the eastern side of Armenia.

XT recently supplied a lump sum design and supply technology package involving an M3000 IsaMill™ grinding plant, an oxidative leaching plant consisting of twelve ZipaTanks™ modular leach and slurry storage reactors and all agitators and support structure, a 10 m diameter high rate thickener, a 120 tpd oxygen plant and a 140 tpd limestone grinding plant. Also included in the package were 54 HyperSparge™ oxygen injection spargers, designed to achieve supersonic injection of oxygen gas for improved reaction kinetics.

Construction of the plant was completed in early 2014, and the project is now in the process of commissioning. Mike Hourn, GM – Hydrometallurgy at XT, said the commissioning of the plant is going well. “XT is actively involved in supporting our client with the commissioning of the Albion Process™ plant, with a large team of engineers at site. Commissioning is well advanced, and all components of the plant are being progressively brought on line, with a view to first feed being processed through the plant in May, 2014. The rapid construction and commissioning of the Albion Process™ plant is a testament to the simplicity and robustness of the technology.”

The Albion plant is designed to achieve a step change in processing the refractory ore, increasing gold recovery from 25% to 85%.

The increase in gold recovery through the adoption of the Albion Process™ is a major business changing technology, with genuine improvement through smarter processing.

XT is also providing design and procurement assistance to GPM to increase the throughput of the existing Ararat concentrator from 500,000 TPA to 1,000,000 TPA. The existing concentrator was constructed in 1973 and is undergoing modernisation to treat the increase in throughput, and provide the refractory gold concentrate for the Albion Process plant.

Right: 54 HyperSparge™ H15 units are part of the GPM Gold’s Albion Process™. These units can provide up to 200Nm3/hr of oxygen to the process (5 bar(g))
Mt Milligan IsaMill™
Commissioning

The two M10,000 IsaMill™ Full Packages supplied to the Mt Milligan operation were commissioned in the fourth quarter of 2013. The supply included IsaMills™, delivery and discharge systems, IsaCharger™ media system and surrounding steelwork. This is a standard “package”, now supplied to a large number of customers.

Mount Milligan is owned by Thompson Creek Metals Company, a growing, diversified North American mining company, with reserves of molybdenum, copper, gold and silver. All operations are located in the United States or Canada.

The Mount Milligan copper-gold mine is located 155 km northwest of Prince George and mid-way between the communities of Fort St. James and Mackenzie, in Canada.

The M10,000 IsaMills™ were chosen for regrinding the rougher-scavenger flotation concentrate due to better energy efficiency, minimal over-grinding and ease of operation. Though there have been several other IsaMill™ installations in Canada and USA, this was the first M10,000 IsaMill™ installation in Canada – and the third in North America.

Greg Rasmussen, Process Manager for XT in Canada, said the grinding duty for the mills was relatively fine, with a total combined flow of 220 mtpm of rougher-scavenger concentrate, being reduced from a feed size (F80) of 150 microns to a product size (P80) of 20 microns. XT engineers from Vancouver and Brisbane offices provided commissioning and training for the IsaMills™, with the successful commissioning completed in the first week of November 2013.
Copper, Windmills and Fish – Making a Difference in the DRC

The DRC plays an important role in world copper production, with over 10% of the world’s copper reserves, and producing over 950,000T of copper last year.

IsaKidd™ technology has been part of this story, with over 500,000 tonnes of copper cathode capacity being installed or under construction in copper oxide operations over the last 5 years. This has resulted in XT supplying tankhouses, duplex cathode plates and high and low capacity stripping machines, as well as training and commissioning services.

Noel Kimlin, IsaKidd™ Commissioning Manager, said the IsaKidd™ technology had played a big role in copper production for the region, with 6 plants and 16 machines in operation or under construction using IsaKidd™ technology.

Noel said a big part of his role in the region has been helping in the technology transfer with the operators and maintainers. Noel said, “The quality of the plants in the DRC is constantly improving, and through our project delivery the commissioning and training support has assisted with the plants being run well”.

One of the recent projects using IsaKidd™ technology was the commissioning of Kamoto Copper Company’s EW2, involving two high capacity cathode stripping machines and the use of some 35,000 IsaKidd™ cathode plates, all provided by XT.

As part of XT’s commitment to the region, it has supported the MuMi Trust, set up by Mutanda Mine Sarl (MuMi). The MuMi Trust (a Community Relations group of MuMi employees and partners) is heavily involved with local community projects. One of the projects was the installation of a windmill at the village of Kando, which was donated by XT, which supplies water for irrigating garden plots producing vegetables, citrus and cereal crops.
IsaMill on Safari – 6th IsaMill™ Users Conference

XT’s 6th IsaMill™ Users Conference was held in South Africa from 22nd to 27th September 2013. The conference was well attended, with 46 attendees attending three days of presentations in Cape Town and two days of site visits in Stellenbosch, Rustenburg and Mokopane.

Cedric Walsta, IsaMill™ Client Liaison Manager for XT, who helped organise and run the conference, said the event was a great success and enjoyed by all, and managed to get together a wide range of users to discuss the technology in use at their sites. Most importantly, they work with XT to set the direction and goals for future development of the technology.

There are now over 120 IsaMills™ installed worldwide in a wide variety of mineral applications. The IsaMill™ technology continues to set the standard for regrinding.

The Users Conference had formal discussions from users, XT and Netzsch on new developments and research projects in IsaMill™ technology. These included the IsaDART™ (mechanical device to simplify maintenance and improve safety), design of the 8MW M50,000 model, segmented shell liners, acoustic emissions project, disc and spacer design for better energy efficiency and bed optimization, as well as process control improvements.

As always there was good input from Users, with presentations and updates from their sites, as well as reviewing the Operational and Maintenance video packages designed to assist operators and maintainers at their sites. One attendee likened the conference to a ‘washing machine’, where sites bring up their operational issues and attendees discuss and then resolve them, like ‘cleaning clothes’.

The final two days involved tours to iThemba Laboratories and a number of Anglo American Platinum sites operating IsaMills. A big thank you to these companies for allowing the tours. Being able to focus on the technology for a number of days, and then go to a site to see the technology in operation shown through by the users, is one of the unique offerings that XT can provide for its clients.

Congratulations to Ernst Swart of Anglo American Platinum Divisional Metallurgical Laboratories for his presentation ‘Laboratory and Pilot Plant Development in Ceramic Media and IsaMill™ Technology’, who was awarded the perpetual IsaMill™ Trophy for Best Site Presentation.

IsaMill™ load monitoring research with CSIRO: www.youtube.com/watch?v=LRPIeB5V8I

XT is certainly proud to be part of these projects and promote further positive development in the region.

Graham Heferen, IsaKidd™ Marketing Manager, said the provision of a continuous supply of clean water had created a big opportunity for the area. As part of a recent trip to the region late last year, Noel and Graham also visited a neighbouring village, Kianyo, where the MuMi Trust was supporting a local fish farm project.

This project involved building eight large dams, and stocking them with fast breeding fingerlings, which are eventually used as a supply of fresh meat for the village. The project also involves chickens penned in coops over the water, with the waste from the coops supplying nutrients that feed the algae, which in turn feed the fish. Eggs and chicken meat are also produced from the project.

Graham said the project had a high level of sustainability, and showed initiative, with waste from the chickens being used as a food source for the fish. XT is certainly proud to be part of these projects and promote further positive development in the region.
Floating with Coal – Jameson Cell Users’ Conference

XT recently hosted the 3rd Jameson Cell Users’ Conference, specifically designed for the coal industry. It was held on the 23rd – 24th October 2013 in Emerald, Australia. The aim of the conference was to enable Users to meet and discuss flotation performance at their sites, including cell operation and maintenance, as well as provide feedback to XT. Over 70 delegates attended the event, from a wide range of users, support groups and researchers.

The two day conference had site presentations on the first day, including several from XT and culminated in a panel discussion, covering topics from flowsheet and fine coal circuit design, bottlenecks and measures taken by sites to de-bottleneck and improve flotation performance. All presentations were of a high standard.

The second day of the conference included a lecture given by Laureate Professor Graeme Jameson, inventor of the Jameson Cell, discussing the fundamentals of the Jameson Cell and his experiences of its early development at Mt Isa Mines. Other talks of interest on the final day included Coal Petrography & its Relation to Coal Flotation (Graham O’Brien, CSIRO), Flotation Circuit Design – Engineering Company Perspective (Terry Wex, QCC Resources & Matt Perrin, A&B Mylec), Fines Circuit Dewatering (Goetz Bickert, GBL Process) as well as many others.

Le Huynh – Jameson Cell Manager at XT, said this type of applied conference was of great benefit to all parties attending. “It’s not often when you can get together the Users of a technology, suppliers of a technology, as well as key providers to the industry into a room and discuss objectively all the pro’s and cons of the technology. This sort of discussion ensures we all learn and take home something we can benefit from, and further advance the technology”

The CEO’S Jameson Cell Award for the best site presentation was awarded to Katerina Zorinyants of Anglo American’s Capcoal site. The award was presented to Katerina by Joe Pease, CEO of XT, at the conference dinner.

Contacts for IsaMill™ Testwork
G&T Metallurgical Services Canada www.alsglobal.com
SGS Lakefield Canada and Chile www.met.sgs.com
JKMRC Australia www.jkmrc.uq.edu.au
ALSAnmitec Australia www.alsglobal.com
HRLtesting Australia www.hrtesting.com
Magotteaux Belgium www.magotteaux.com
University of Cape Town South Africa www.uct.ac.za

Contacts for Albion Process Testwork
hrtesting – www.hrtesting.com

Contacts for Jameson Cell Testwork
Xstrata Technology – jamesoncell@xt-t.com