More than provincial

Canada’s home grown equipment and technology players continue to wield influence domestically and abroad, with Vancouver and Toronto listed juniors a fertile source of potential new customers, reports Paul Moore.

With PDAC in Toronto this year attracting over 30,000 delegates according to some estimates, the resurgent boom for Canadian-listed junior mining companies and associated project investment was plain to see. Mothballed domestic projects like the Jericho diamond mine in Nunavut are being looked at again, in this case by Shear Minerals, while a wealth of new projects at home and abroad were nearing development, from Papua New Guinea to Alaska.

The Investors Exchange hall had in the region of 650 companies represented, from those with a few core boxes and a poster, right up to the likes of Xstrata, Teck, Vale and Rio Tinto. China, and its gathering up of Canadian projects, was also a topic discussed, though at times it is difficult to discern where the Chinese influence is, such is the use of obscure parent companies and cross shareholdings to the point where it may not be immediately obvious.

What is clear, however, is that several projects are structured in such a way where a Chinese metals group has an offtake agreement and share in the project but also crucially a lot of influence in the mine infrastructure and equipment used, with a preference towards Chinese suppliers.

However, the upturn also applies to Canada’s providers of mining equipment and services, many of which are represented by CAMESE (Canadian Association of Mining Equipment and Services for Export) and were exhibiting in the Trade Show hall. Some of these are small locally-owned companies that have found a niche in mining; some like Redpath had their beginnings and are still headquartered in Canada but are now well known and active worldwide for their expertise. There are also Canadian subsidiaries of large multi-national companies.

The following summarises some new technology and equipment developments from a wide variety of Canadian companies involved in the mining sector.

**Underground mining**

One of the leaders in dedicated mine scaler design, **Breaker Technology** (BTI) has introduced the new HS18 Mine Scaler. The company has been associated with strong and reliable scaling equipment for the mining industry for the past 20 years.

As the mechanised scaling process has evolved, there has been a push to have scaling equipment that is strong and rugged, but also small and manoeuverable to negotiate the demanding underground environment. BTI feels they have met that requirement with their latest innovation in scaling technology.

The HS18 Mine Scaler combines the ruggedness of current BTI equipment and the flexibility of its stationary boom systems. By combining the strengths of both technologies, BTI states that it has created a “small, highly manoeuverable machine that can reach multiple scaling faces and positions with a single set-up.”

The scaling end of the machine consists of a slewing bearing mounted on the implement end of the scaler. This bearing allows for 180° swing of the boom to cover the face, roof (back) and both side walls from one position.

The new BTI HS18 Mine Scaler

Winnipeg-based **Cubex** is well known as an industry-leading ITH drill manufacturer for underground mines. The company has expanded progressively, with leading edge equipment located in all of the major mining centres worldwide. One of the most complex but most successful projects has been in conjunction with the Cameco McArthur River uranium mine to develop a system to safely and effectively drill freeze holes.

A tracked boom drill known as the Cubex Scorpion was designed for improved feed positioning. With an onboard Wassara water hammer, the machine allows for hole diameters ranging from 2.5 in to 6 in. To minimise the use of LHDs, and for easier machine setup, the unit was designed with a high pressure on-board water booster (95 gpm at 2,600 psi), and on-board diesel engine.

The Scorpion drill is being used successfully at Cameco’s McArthur River uranium mine.
Radio-active leaks and high ground water pressures in a high grade uranium mine like McArthur River can create a dangerous working environment, requiring highly efficient and flexible equipment. Diamond drills used for these holes were very slow and mobilisation/demobilisation could take over two days for one hole. Using Wassara, the Scorpion is also more efficient than diamond drilling by a factor of five.

On the Scorpion, the flexibility of the feed has eliminated the need to move the drill with each new hole. During commissioning, 24 holes were accurately drilled without moving the carrier. And due to the extendable boom and multi-access pivot of the feed, more holes may be possible without moving the carrier. Safety is also greatly improved, with the feed able to be well positioned for loading pipe, while hole setup is measured in minutes, instead of days.

The drill was successfully commissioned in March 2010, and Cubex is already involved in the next freeze drill program at Cameco’s McArthur River. This project and the wider mine will be the subject of a detailed IM article later this year.

Dux Machinery has an important order from IAMGOLD for its in-development Westwood gold project in Quebec, recently visited by IM. Five of the 1212 model Scissor Cassette units are scheduled to be delivered by the end of 2011. The 1212 is a new, narrower version of the P1-Porter, with the operator seated behind the wheels. It is equipped with a 173 hp Mercedes engine and larger 32000 series transmission for fast traming up steep ramps, along with the scissor cassette. These units were custom-built for IAMGOLD. The scissor cassette also has a 23 in side shift feature.

Toronto-based mining contactor Dumas showcased a new corporate image and its international capability at the recent PDAC event. Within the last 12 months Dumas has announced two international acquisitions which have expanded the company’s services offerings into Mexico, Guatemala and Peru. In October 2010, Dumas announced its acquisition of L&L Contratista Mineria (L&L) and then in February 2011, the company bought out Mexico-based mining contractor International Specialised Mining Services (ISMS).

RDH is expanding its Ultra Low Profile range for mining and tunnelling.

The acquisition of L&L was an important initial step for Dumas into the rapidly growing mining market. As Peru’s only shaft-sinking mining contractor, L&L immediately positioned Dumas as one of the leading contract miners in Peru,” said Daniel Dumas, CEO.

He added: “We were attracted to ISMS due to the shared focus on industry-leading safety performance and technical capabilities. In addition to this aligned operating philosophy, ISMS and Dumas also share a highly complementary client base. This acquisition serves to further strengthen Dumas’ operating base throughout the Americas and allows us to better serve our key clients across their projects globally.”

Internationally, Dumas has also begun work in Burkina Faso, West Africa and the company believes that its roots as a French-Canadian group has positioned it well in that region.

In September 2010, Dumas also opened a new Toronto headquarters in Bay Street. “The move to a corporate presence in downtown Toronto reflects the increasing international aspect of our business but also importantly, positions us closer to our Canadian clients’ corporate bases. We will continue to remain close to our clients’ operational bases and mining communities by retaining our Ontario Office in Timmins and Quebec Office in Val d’Or”, stated Daniel Dumas.

RDH Mining Equipment, a leading player in narrow vein mining equipment, has been focusing much of its resources recently on expanding its equipment range. As such, the company is currently developing its Ultra Low Profile line of equipment which includes jumbos, ANFO trucks, and utility vehicles. The ULP equipment provides many advantages including the mining of less waste rock resulting in increased tonnage of higher grade material. Processing and refining efficiency is improved, as ore dilution is reduced and grade is increased.

The Ultra Low Profile Drillmaster is a specially designed hydraulic tunnelling and mining rig for low roof heights with a traming height of only 1.5 m. The ULP ANFO Master ANFO Truck and Crew Master Personnel Carrier have also been designed to perform in low headings, both boasting a traming height of only 1.5 m. The Crew Master was designed and developed to work in Zimbabwe’s Great Dyke platinum deposit. All Ultra Low Profile units feature a robust, articulated carrier with four wheel drive for easy maneuvering in narrow tunnels and drifts.

Finally, the Muckmaster EB, currently in development, is a fully battery powered LHD which is both environmentally and operator friendly with reduced noise and elimination of diesel emissions. Benefits of the Muckmaster EB include reduced energy, operating, ventilation, and maintenance costs.

Other notable development projects in the past year include RDH’s Permissible line, which include models that are MSHA approved to work in gaseous or potentially explosive environments.

In raise boring technology, The Redpath Group has officially completed the longest and largest directionally drilled raise bore hole in North America. At 6.7 m in diameter and 846 m long, it is also the fifth largest in the world. Redpath bored this ventilation raise
at IAMGOLD’s Westwood Project where breakthrough occurred on February 13, 2011. IM recently visited this project, and a detailed article covering the construction of the shafts at the property as well as the wider mine plans, will be covered in a future edition.

The work was completed using Redpath’s own Redbore 100 raisedrill, the highest thrust machine and largest capacity raisedrill in the world. The new drill had to overcome incredibly adverse ground conditions where rock integrity, for the first 122 m, was so poor that the raise began to “squeeze”, causing very large pieces to fall.

The Redbore 100 delivers a faster, more efficient and safer way to make a bigger hole in the ground. It has the capacity to raisebore 1,000 m in depth by 8 m in diameter in one pass. Its compact design and low profile construction allow underground mobility and the facility to minimize excavation. Powered by a 600 hp variable frequency AC motor, the Redbore 100 delivers 15,569 kN of thrust and 56.9 kN.m of breakout torque.

Additional to its thrust and capacity, new and sophisticated computer technological feedback features of the Redbore 100 enable operators to receive and analyse more feedback features of the Redbore 100 enable sophisticated computer technological features of the Redbore 100 enable operators to receive and analyse more feedback from the drill. The solutions provide an integrated approach to data collection, data analysis and data dissemination.

Marland Lasers, allows for the simplification and improvement of the performance and accuracy of repetitive underground alignment tasks by miners, drillers and surveyors alike. In recent years, its products have been widely used by raiseboring giant Redpath at some of the leading global underground mines and projects where it operates or has operated. This includes three Marland Model 500 mine lasers at Oyu Tolgoi and five Model 500s to Freepoint McMoran in Indonesia in 2006. In 2010, another raise boring company, Arkbro Industries, bought seven of the same model for use in southern Asia. The newest 510 model is now commercially available.

The company’s drill lasers and layout lasers are now widely used by one of the major potash miners.

Boart Longyear’s contract blasthole drilling division in Haileybury is also a major customers, and has purchased about 200 drill lasers specifically designed for their rigs. In 2010, five drill lasers were also sold to Anglogold Ashanti Obuasi in Ghana, two of which are used on Boart Longyear production drills and three on Atlas Copco Simba drills.

**Software**

Gemcom at PDAC launched its new Gemcom Hub™ solution, described as “an innovative new data management solution for the mining industry.” Optimised specifically for exploration and production data, Hub enables the rapid transmission of large data files – including large geological models, drillhole data, schedules and surveys – using the internet, even over intermittent and low bandwidth connections common in remote minesites. By centralising data, critical project information is protected, auditable and accessible to those who need it across the mining enterprise.
According to Gemcom, Hub closes the gap between a mining head office and remote site, supporting the quick and easy global transfer of data “to enable skilled staff to spend more time assisting in the field without the need for travel.” With intuitive searching and versioning capabilities, Hub makes it easy for users to locate or recover the right information in a controlled and auditable manner, states Gemcom, “integrates seamlessly with the existing stored data generated from the vast majority of the industry’s exploration, mine planning and production software.” It also manages the file output from the common office applications used by mining staff. Rick Moignard, Gemcom CEO commented: “By taking a targeted approach to data management, Hub helps to overcome key industry challenges such as skill shortages, reporting, driving productivity, and cost control.”

Matrikon, now a part of Honeywell, is an Edmonton-based company that focuses on “delivering process control, asset monitoring and cyber security solutions to the mining and process industries.” Matrikon’s Mining Solutions offer mobile and fixed asset monitoring capabilities as well as enterprise-level operations management developed specifically for the mining sector.

The Mobile Equipment Monitor solution allows mines to capture sensor data and OEM alarms from mobile assets and provides a toolset to visualise and analyse this data. This data is communicated to the central maintenance or dispatch departments via the mine’s wireless network, where alarms and performance of the equipment can be monitored and appropriate action taken.

The data is made available to end users in a number of ways. Alarms are visible in a real-time alarm viewer and as they ring in, fleet monitors can handle each alarm. Fleet overviews provide a high-level view of the health of each asset in the fleet. Additional information is available through equipment displays, which show an asset’s key sensor data and trends. In addition to the real-time information, Mobile Equipment Monitor makes extensive historical data available to support long-term analysis.

Early detection of developing problems allows maintenance departments to intervene well in advance of major incidents such as catastrophic engine failures, saving significant repair and lost productivity costs. User-defined alarms can be created to provide additional analysis and alert the mine to developing issues. Mines can use this knowledge to develop condition-based maintenance programs. Operation of the equipment can also be monitored, which helps the mine identify issues that can be addressed with additional operator training.

Matrikon’s remote operation centres offer an enterprise-level view of a mining company’s operations, consolidating operational data from multiple areas of a mine and multiple mines. The centres integrate mobile asset monitoring with monitoring of fixed assets and other types of operational data, such as dispatch and production numbers.

**Exploration**

A new core orientation system recently launched is the Corient® from Fordia, which was also featured in our recent exploration technology article. Corient is a mechanical device that integrates seamlessly into drilling operations and provides easy marking of core samples to record their original orientation in the ground. This data allows geologists to plan campaigns more effectively and optimise drilling costs. Corient requires no supplies, batteries or calibration and employs no fragile electronic components.

While core orientation has not yet been adopted as a standard measure at all mineral exploration sites, it is growing in popularity. The data it yields allows geologists to determine the precise orientation of a core prior to removal, for greatly improved analysis of faults and geological structure. This facilitates the definition of drilling campaigns and increases the likelihood of finding mineral deposits. The Corient system is now available for rental in Canada and it will shortly be launched throughout the rest of the world.

Over the last few years, Energold has carved out a niche of providing socially and environmentally highly portable drilling services in ‘frontier’ and ‘brownfield’ exploration projects. The total fleet includes 103 drilling rigs and 5 under construction, with the majority composed of 78 highly portable drills. Through continuous investments in research and development, recent innovations in the use of hydraulics and portable motors, can compete head to head with most conventional drill rigs without the resulting large environmental footprints. By both employing hydraulic power and modularising the entire unit, the transmission, head and chuck were removed creating a truly “highly-portable” drill with its heaviest component not exceeding 400 lb in weight. The result is the EGD Highly Mobile Surface Rig, which was designed and contracted out to clients in the field.

Continuous research and development has also enabled Energold to upgrade its rig depth capacity from only 150 m to over 800 m. A current prototype EGD Series 4 Surface Rig is being developed to surpass 1,000 m depth capability which for its size, makes it very competitive in the marketplace. Pull-back strength has also been significantly increased allowing heavier down-hole weights which enable larger core sizes to be used.

Another major development for Energold has been the development of the EGD Underground Rig. Utilising over 80% of interchangeable parts of the EGD Highly Mobile Surface Rigs, the EGD Underground Rig is a highly technologically advanced and mobile underground rig, built to deliver the toughest performance in a modular component design. The main obstacle to drilling underground is the size of the rig and the size of the workings. The company designed it in a way where the heaviest component is 1,835 lb and uses a 125 hp electric motor with depth capabilities of 300m.

The company has also recently acquired the UK’s Dando Drilling International. The Dando
features considered key to hosting a broad exploration; and readily available data. Low cost target selection and “grass roots” recent exploration results; amenability to initial mineralization; demonstrated historical and or those features most favourable for Ni-Cu-PGE exploration; geological setting (the presence of the current economic potential; accessibility to deposits. Targets were then selected based on demonstrated potential for hosting Cu-Ni-PGE such settings, all of which have various levels of significant exploration potential. WGM has released a limited number of volumes of this study on a first come basis. Each volume comes complete with hard copy maps identifying the recommended follow up target areas.

CanDig Inc specialises in adaptable mini excavators, for which a key market is the ability to excavate exploration trenches in difficult terrain. Yukon prospector, Shawn Ryan commented: “We needed a small excavator that could be used for mineral exploration that was helicopter portable. The CanDig excavator appeared to be the best one as it was the lightest and had already proven its worth as a trenching machine. It was instrumental in the White Gold discovery of Underworld Resources in the Yukon. Now we are using five of them on other Yukon projects with great success. The CanDig Mini Excavator follows up soil anomalies and can dig down to 8 ft in depth. A Bell Long Ranger helicopter can easily carry the excavator to the exploration site or we break it down into two pieces when using the smaller Bell JetRanger 206 helicopter.”

Attributes include stability on uneven ground, its helicopter transportability, and the fact that it is fully equipped with multiple spare parts. It now also has an auger feature that adds to its versatility.

To date, CanDig has built more than 210 mini excavators, which operate in the Americas, Europe and Africa.

Utilities and fuel
Mining vehicle air temperature control specialist, Polar has introduced its P-1000 FH models of fully hydraulic air conditioner, part of the new DigAire line, to the mining Industry. The Polar DigAire series of air conditioning systems are suitable for heavy equipment such as shovels, dozers, haul trucks, loaders, excavators, drills and underground equipment applications. Because of its modular one-piece construction, the unit is easy to install and swap out between machines, with minimal downtime. The DigAire also requires little maintenance because of its corrosion and vibration resistant construction. It is 100% hydraulic, no electrical power is required and can work well in ambient temperatures exceeding 55°C. It is also manufactured with MSHA rated components. The DiAire series is also available in the P-1100 vertical model configuration.

Electric Power Generating Equipment (EPGE) is a supplier of electrical power generating equipment and electric load testing equipment for mining and other industries. Its product line includes the exclusive Canadian distribution of Raylew Power Systems high quality AC resistive load banks, new and pre-owned reconditioned diesel or natural gas fuelled reciprocating engine driven generator sets at 50 Hz and 60 Hz, alternative energy power options such as waste to energy, biogas, and solar powered systems designed and packaged to CSA standards.

EPGE also provides 24/7 support for the industrial requirements of large or small scale independent generator power systems with sales and service of AC and DC generators, obsolete generator parts, synchronizing control panels, paralleling switchgear, automatic transfer switches, manual transfer switches,
electrical metering, automatic voltage regulators and generator excitation systems.

The company also supplies electrical verification equipment, power quality analyzers, chart recorders and qualified technical support to provide third party independent electrical load testing of standby generator sets including gas turbines and UPS systems on a commissioning basis, or on a preventative maintenance basis from 100 watts up to 15 MW.

SEI Industries has just announced a new fuel transport concept – the Bulk Aviation Transport Tank (BATT). SEI claims this to be the world's first collapsible, double walled, aviation specific, baffled transportation fabric tank that enables users to safely transport bulk fuel to remote sites via aircraft. It can be sized to any aircraft and is ideal to transport fuel to remote exploration and mining camps.

The company believes that BATT will save remote site operators money, improve safety and is more environmentally friendly than traditional drum methods of aviation fuel transport. SEI also supplies the Arctic King collapsible fuel bladder tank range, used for transferring fuel from the BATT to static fuel storage tanks on the ground.

Some of the benefits include its specific design to fit inside each airframe and its light weight maximising the carrying capacity of the airframe. It can be rolled up when empty allowing the aircraft to carry cargo, core samples or personnel on the return trip. It also eliminates continued handling of the drums which can result in damage and spills inside the aircraft. On the ground, empty drums are also eliminated, which are often abandoned because of the high cost associated with removing them.

In Canada, only fuel drums are currently allowed to transport fuel without special permits. SEI is in the process of receiving a TDG Equivalency Certificate from Transport Canada allowing the BATT to be used without special permits for transporting fuels.

Open pits

In open pit technology, Instantel, a division of Xmark Corp and a member of Stanley Black & Decker, is a leading supplier of vibration and overpressure monitors for mine blasting operations. Its vibration and overpressure monitors are used in over 110 countries in various mining, construction, and geotechnical applications. A new offering is the Minimate Pro4, a four-channel unit, which is designed to monitor with two triaxial geophones.

The Minimate Pro6 monitor

The Minimate Pro6 monitor and IV monitors have been designed to withstand the harshest environments and have a rugged design with a cast aluminium case, fully sealed top panel, and non-corrosive, impact-resistant connectors. These monitors feature improved RF immunity and EMC performance exceeding CE class B requirements. An enhanced user interface includes intuitive menus, larger backlit display, and multiple font sizes.

With the real-time operating system, uninterrupted event monitoring can be achieved, ensuring zero dead time between events. The flexible sample rates from 512 to 4,096 offer programmable record times of one second to more than one hour, and the expansive memory offers a capacity for over 8,000 one-second events at a sample rate of 1,024 S/s. Ethernet communications allow high speed data transfer of recorded events, uploading of setup configurations and live data PC display on your PC.

Ingegneria Dei Sistemi (IDS) is a global company specializing in radar technologies for civil engineering and mining applications. The GeoRadar division of IDS is a leading supplier of robust, reliable and user-friendly radar systems, including slope-monitoring radar and ground-penetrating radar, designed to improve safety measure and to assist with production optimisation.

In 2008 IDS opened its North America subsidiary, IDS North America, based in Montreal, Canada to support the growth of company business in the North American market mainly focusing on the local mining industry.

Since early 2010, IDS NA has been introducing IBIS-M in North America – an innovative radar solution originally developed for landslide monitoring but which has been adapted to cater for the requirements of the mining industry. IDS states that the IBIS-M success is attributable mainly to its ability to rapidly measure slope movements at long ranges with sub-millimetre accuracy, providing in real time effective alerts in the event of progressive movements that can potentially lead to mine slope failure.

More than 10 IBIS-M units have been deployed in North America and globally, IBIS-M systems are operating in 12 countries. The company believes that it has an advantage due to the radar technology employed that eliminates the limitations of previous generations of radar designed with parabolic...
Simlog truck and shovel simulators at Taseko Gibraltar Mines

dish antennas. IDS states that IBIS-M significantly increases operating distance up to 4,000 m, provides higher spatial resolution, a reduced acquisition time, and the accurately provision of atmospheric correction using automatic procedures.

It has a modular composition consisting of different configurations ranging from permanent installations to trailer-based systems, with several optional tools available.

Simulators

Montreal-based mining equipment simulator supplier, Simlog, has announced an update to its Mining Truck Personal Simulator that allows the Replica Controls to be set up to use either a Retarder Pedal or a Retarder Lever, reproducing the operator controls in a wider variety of mining trucks. The Mining Truck Personal Simulator puts trainees at the controls of a large haul truck in interaction with a simulated electric rope shovel at work in a virtual mine. When used together with Simlog’s Electric Rope Shovel Personal Simulator, as implemented at Gibraltar Mines, the two simulators provide a cost-effective instructional solution for training beginners and upgrading the skills of experienced operators.

Simlog states that its simulators allow mining companies to achieve up to 50% improved operator productivity, quickly and safely, through better skills assessment and skills development. All Simlog simulators feature multi-language support and built-in Instructional Designs focused on teaching critical core skills in accordance with global standards and best practices. Simulation results are automatically saved in a networked database with a free viewing utility that allows off-site staff to monitor training progress. A variety of setup options are provided for classroom and portable training Return on investment is realised by reducing the time equipment is removed from production, minimising wear-and-tear and accidents arising from operator inexperience, and significantly cutting fuel expenditure associated with operator training.

In 2011, Gibraltar Mines, owned by Taseko, purchased a Mining Truck Personal Simulator and an Electric Rope Shovel Personal Simulator from Simlog. Gibraltar states: “The mine training department learned about this technology in 2010 and was eager to demonstrate its usefulness and effectiveness to the management team. Simlog’s innovative 3D simulation technology allows trainers and trainees alike to experience the reality of an open pit mining operation within the confines of a classroom setting. The self-paced learning system allows employees to advance at their own pace on their own time, but still provides a challenging environment as the employee improves and becomes competent and efficient on the equipment.”

The advanced training technology is beneficial to the operators as it reduces anxiety in new trainees and provides them with the comfort of knowing that their mistakes will not be damaging the equipment. In addition, it allows training to take place without compromising production by removing equipment for the sole purpose of training.

Testing and analysis

Testing facilities are available at both private and partly government-funded locations. The Saskatchewan Research Council's (SRC) Advanced Microanalysis Centre™ opened in February 2010 as a joint investment from the provincial and federal governments of Canada and SRC.

The centre has two complete thin section laboratories, one of which is dedicated to the preparation of thin sections from radioactive material and is located in a Canadian Nuclear Safety Commission (CNSC) licensed area for handling uranium ore, with a state of the art electron microprobe (EPMA) and a scanning electron microscope (SEM).

The centre is located at the SRC in Saskatoon and provides world-class research equipment and expertise to support mineral exploration programs and development projects in chemical and materials engineering.

Working with SRC's Geoanalytical Laboratories, the Advanced Microanalysis Centre interacts with global clients to develop and provide services for several mineral sectors including uranium, gold, base metals, diamonds, potash, rare earth elements and petroleum.

The centre recently expanded its facility and equipment, thanks to new joint federal-provincial funding. The new equipment gives Saskatchewan mining companies and other industry sectors access to an extensive set of analytical services and state-of-the-art technologies that were previously inaccessible in the province.

The additional funding has allowed the centre to expand its analytical capabilities to meet evolving industry needs, such as the growing interest for an advanced analytical package and isotopic analyses for uranium and rare earth elements. The advanced analytical package combines the Centre’s newly purchased High Resolution Inductively Coupled Plasma Mass Spectrometer (HR-ICP-MS) and two additional X-ray fluorescence (XRF) spectrometers. The HR-ICP-MS provides specific trace-element chemistry and in situ isotope measurements, while the XRF performs rapid, accurate whole rock analysis.

The HR-ICP-MS allows for routine measurement of key isotope ratios that will be vital for discovering new resources. This new service will aid in the exploration of lithium and rare earth elements that are in high demand for batteries and magnets. The expansion also includes a new X-ray diffractometer (XRD), incorporating the latest detector technology.