

Lycopodium



Shareholder Report 2019

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- 39,732,373 shares on issue
- 182.9 cents net tangible assets per share
- \$154.0 million revenue
- \$16.5 million net profit after tax
- 41.5 cents earnings per share after tax
- 30 cents dividend per share (fully franked)

My name is Mick Caratti. I am one of the founders and chairman of Lycopodium. This publication is designed to introduce you to the Company, telling you who we are, what we do and how we see our future. This report does not replace the statutory financial statements but is designed to provide an informative insight into Lycopodium in an easier to read layout.



In my section of the report I usually try to give an opinion of what we see in the industries and markets that our subsidiaries service.

The 2108/2019 period has seen considerable movement in the metal prices that drive demand for our mining services and are an indirect indicator of demand for our industrial services. Nickel has firmed. Copper has risen and then fallen back. Iron ore has had a wild ride but has fallen back post the end of the financial year. Lithium has fallen considerably and gold has continued to climb. In the industries we support outside of mining, the process industries have remained at a low level of activity and the rail business has continued to improve in both private and government infrastructure projects.

While I read many opinions about these changes and their causes the overall conclusion that I draw is that for Lycopodium, the ability to service a wide range of commodities and industries in as many countries as possible is the best strategy for remaining profitable in such unpredictable times. The Company has had a strategy to extend its range of skills and its reach for many years and as a result has done well in all but one year of its 15 year history as a public company. Peter De Leo talks about the steps being undertaken under his leadership to build on this strategy in his report which follows.

One feature of this cycle that I have mentioned previously is that projects are still being financed and constructed - though often with long delays - in spite of the price volatility. This was not a feature of previous times of uncertainty in my experience. It is particularly surprising in view of the predicted material impact on world trade issues like Brexit and the trade policies of the US.

As I said last year Lycopodium does not view a balanced market as unfavorable but it is our feeling that conditions have worsened a little in the last year. While our work load for the next year is reasonably secure the view going forward is highly dependent on factors such as the one mentioned above that are beyond anyone's ability to predict.

The year has seen a major milestone for the Company with the retirement of Rod Leonard and Bob Osmetti, two of the five original founders. Between them they have held most of the senior roles in Lycopodium and have had major impact on the growth and development of the company over its

27-year history. On behalf of the Staff, the Board and the Shareholders I thank them for their tireless contribution and wish them well in retirement. We are lucky that while they will be stepping down from executive roles they will continue as mentors and in non executive director and consulting roles.

As has been announced post year end Keith Bakker our CFO and Company Secretary has retired after 23 years with the company having joined us when the company had less than 100 staff and was just beginning to work outside of Australia. In that time we have undertaken projects in over 20 countries and while we often talk about the engineering challenges, the financial and accounting challenges are possibly even more difficult. The fact we have been successful in all these regions is a tribute to Keith and I thank him for his efforts.

The replacement of the senior management of a company is an ongoing challenge and one that can be overlooked in the rush to take care of the daily problem solving that is what management can seem to be. When a company is well managed however the retirement of senior people can be of great benefit in that it allows the people who have been taking care of the daily problems to step back and assist a new generation of managers. Some managers are born but most have to learn their skills from others.

During boom times Lycopodium has, like most companies, had little ability to focus on succession planning. However since 2014 it has been a major focus and the replacement of these three very senior people has been exceedingly well planned and executed. We look forward to introducing you to the new team in future reports.

I would like to commend the whole Lycopodium team for their performance and success this year. As I said last year the variety of projects commodities and regions in which the projects were undertaken is impressive and the success is a credit to the team. On behalf of the Directors and Shareholders – Thank you.

I hope you find this report informative and readable and if you would like further information please give us a call.

A handwritten signature in black ink that reads "Mick Caratti". The signature is written in a cursive, slightly slanted style.

MJ Caratti



MANAGING DIRECTOR'S REPORT

The past year has been busy and successful for Lycopodium. Much has been accomplished as we evolve to meet the challenges and opportunities within our industry. We have continued to pursue our strategy of growing a strong business with depth and breadth of skills to deliver quality services across the diversified sectors of resources, infrastructure and industrial processes. This strategy is reflected in the results for the year.

FULL YEAR RESULTS

For the financial year ended 30 June 2019, Lycopodium generated revenues of \$154 million and a net profit after tax of \$16.51 million.

The Directors have resolved to pay a final dividend of 15 cents, which is in line with the dividend policy. The total dividend for the year is 30 cents fully franked.

ACTIVITIES FOR THE PAST YEAR

Within the mineral resources sector we have continued to build on the number of geographies in which we deliver studies and projects, working across a wide variety of commodities and for all tiers of client from explorers through to majors. In addition to our traditional Australian and West African geographies, we are delivering projects in Asia, Europe, the Americas and Canada.

To assist in delivering projects in Africa we have opened additional offices in Cape Town and Johannesburg where we will be tapping into the significant availability of quality personnel to grow around our existing South African teams.

We have moved our Manila operation into new premises in the Bonfacio Global City (BGC) area of Manila. The new premises provide our Manila based team a fresh home and modern facilities to continue delivering their high quality outputs, in support of all of our global operations in an efficient and effective manner.

As reported last year we continue to work to ensure that our service offering is of a consistently high quality across our various mineral resource related operations. During the past twelve months we have continued our organisational connectedness to support greater collaboration,

workshare and ultimately effectiveness in the way we deliver our services across the globe.

In the infrastructure sector we have continued to refine our target market and have focused our efforts on rail infrastructure management (RIM), rail related engineering and project delivery services, mineral resource related non-process infrastructure and infrastructure related asset management.

In the industrial processes sector we have continued to diversify away from our traditional markets such as manufacturing and have used our skills on a range of briefs including renewable energy, cannabinoids and sustainability related projects.

We have embraced Industry 4.0. We have established a new joint venture company (see Page 6) which offers operating mines real time process optimisation services; we are intimately involved in De Beers' leading edge 'Plant of the Future' work; and we are always testing, developing and rolling out advanced engineering tools in support of our operational efforts.

We have continued to develop projects on a range of contracting models and have demonstrated our ability to successfully deliver projects on an EPC basis to complement our long and successful track record in EPCM service delivery.

SUCCESSION PLANNING

Our long term succession planning was put into practice this year with Karl Cicanese succeeding Rod Leonard as the leader of our Minerals division and Andrew Carnie succeeding Bob Osmetti as Managing Director of Mondium Pty Ltd, our incorporated joint venture with Monadelphous Limited. These are very important

transitions as both Rod and Bob were founding directors of Lycopodium and have been instrumental in establishing the success and culture of the company. The succession has been managed carefully and smoothly, with Karl and Andrew seamlessly taking on the responsibilities of those roles, while Rod and Bob have transitioned into non-executive director roles on the board of Lycopodium Limited.

OUTLOOK

We operate in interesting times which emphasises the need to remain nimble and flexible in how we approach our markets.

In the resources sector over the past twelve months we have been active on gold, copper, nickel, cobalt, iron ore, phosphate, diamonds, rubies, lithium and graphite projects. The current outlook across this basket of minerals is mixed. Whereas the gold price is at historical highs, forecast prices for other commodities are less clear. However, the broad range of commodities and geographies within which we operate allows us to take advantage of the opportunities and meet the challenges the market presents. We have a strong pipeline of projects and key prospects that we believe will underpin our operational and financial performance.

As mentioned earlier, within the infrastructure sector we rationalised our target market to rail, asset management and resource project related infrastructure, areas we consider ideal for the services we provide.

In the industrial processes sector we continue to leverage our expertise in, among other things, complex chemistry, heat and mass transfer and solid / liquid separation, into emerging



opportunities such as cannabinoids, light metals and water purification. The industrial processes market remains very competitive and quite broad. Our leadership team is continuing to look at how to leverage our expertise for greater return.

OPERATIONAL HIGHLIGHTS

Refer later in this Shareholder Report for more detail however the following provides a summary of our operational highlights for the year.

Resources

- **Cobré Panama Project**

We have been working with First Quantum Minerals Ltd (FQML) since 2013 on the Cobré Panama Project. This project continues our collaboration with FQML to support its project development style along with budget and schedule targets now spanning over six projects in Australia and Africa. Through its Panamanian subsidiary, Minera Panama S.A., FQML is developing this large concession. The project involves the largest unit processing equipment in the world resulting in a facility capable of processing 85 Mtpa of primary ore to produce concentrate of copper as well as a number of other minerals / metals.



Over the past year, Lycopodium has completed the process plant design and the services to non-process infrastructure buildings as well as providing some field engineering and plant commissioning support personnel in Panama. We are very proud of our association with FQML as well as our role on this world class project which has an expected mine life of 40 years.

- **Ity Project**

In 2017 Endeavour Mining Corporation (Endeavour) awarded the EPCM services contract for the delivery of the Ity Project to Lycopodium. Ity, located approximately 700 km northwest of Abidjan, has the longest history of any gold mine in Côte d'Ivoire, producing more than 1.2 million ounces of gold over more than 25 years of production. Lycopodium provided the full EPCM services for the gold CIL plant, capable of 4 Mtpa of a blended gold bearing ore. In 2018 we also undertook a debottlenecking review of the Ity mine plant design to increase the plant nameplate capacity to 5 Mtpa. The upgrade was approved and through the third quarter of 2018 engineering and

procurement was completed in parallel with the construction of the existing project. We are proud to be associated with this project which achieved first gold in March 2019 some four months ahead of schedule.

- **Toka Tindung Project**

Over the past few years Lycopodium has worked with PT Archi Indonesia (Archi), an Indonesian based gold mining company, to upgrade the plant processing facilities at Toka Tindung site. From March 2017 through to November 2018, Lycopodium provided full EPCM services for a throughput upgrade of the process plant facilities from 2.4 Mtpa to 3 Mtpa. The upgrade was successfully executed within budget and schedule, with Practical Completion achieved 1 November 2018.

- **Wagnion**

In late 2017 Teranga Gold Corporation (Teranga), awarded Lycopodium a contract to provide EPCM services for the process design, engineering design, procurement, construction management and commissioning of the 2.0 to 2.7 Mtpa (average LOM throughput rate of 2.5 Mtpa) process plant for Wahgnion. Engineering design was completed for support infrastructure including the accommodation village. Commissioning of the process plant is in progress with the first gold pour expected in 3Q2019 and production ramp up in 4Q2019. The project is set to meet budget and schedule targets having achieved an excellent health and safety record.

• **Bonasika**

In June 2018, Lycopodium was awarded the contract for the provision of detailed engineering and technical procurement support for the greenfield Bonasika bauxite project developed by Guyana Industrial Minerals (GINMIN) near Georgetown in Guyana. The project is estimated to have a mine life of 25 years and will process 350,000 tonnes of raw bauxite a year, for use in sintered bauxite products. By June 2019 Lycopodium's scope had effectively been completed.

• **Montepuez Ruby Mines – Recovery Plant**

In late 2018 Lycopodium (via ADP Marine and Modular) completed the installation of the MRM Ruby Recovery Plant. The final recovery was designed to incorporate UV-sorting technology to recover rubies from DMS concentrate that was produced from processing both primary and secondary alluvial ore bodies. This process plant was designed to fit into 36 modules all of which have the same outer dimensions and this being the same as a standard 6 m high cube container. After transport to site in Mozambique the modules were all assembled, interconnecting services completed and the facility successfully commissioned. Lycopodium has subsequently been requested to provide further engineering services with a view to further plant upgrades.

• **Sanbrado**

In October 2018 West African Resources awarded Lycopodium the contract to provide full Engineering and Procurement (EP) services on the Sanbrado Gold Project in Burkina Faso, with subsequent award of the balance of Construction Management (CM) services in the 1H19. The Sanbrado Project, is fully funded to production and expected to pour first gold in Q3 CY2020. This project represents Lycopodium's seventh project in this country in the past five years.

• **Boto**

In October 2018, IAMGOLD Corporation (IAMGOLD) announced to the markets positive results from the Feasibility Study for its Boto Gold Project in Senegal, West Africa. This Feasibility Study, completed jointly by IAMGOLD and Lycopodium, outlined an economically robust project with an anticipated low cost of production and long operating life. In February 2019, after a competitive tendering process, Lycopodium was issued with a Letter of Intent by IAMGOLD appointing Lycopodium as the preferred EPCM partner for the Boto execution stage, pending a decision to construct. Although the full project go-ahead remains to be received we commenced work in May 2019 on a study update looking at further optimisation of the Boto plant and infrastructure with an increased plant throughput.



• **Toliara**

Using the PFS as a basis, Lycopodium, in conjunction with Mineral Technologies, is managing the preparation of the Definitive Feasibility Study (DFS) with a scope of services that will see the completion of all work necessary to provide a complete DFS for the Toliara project in Madagascar. The project will produce ilmenite, zircon and rutile. The owner, Base Resources Limited (Base), is an Australian domiciled, African focused, mineral sands producer and developer that operates the established Kwale Operation in Kenya. The DFS will determine project design, execution planning and financing and is due to be completed by late 2019. A final investment decision is expected to be given by Base in the first half of 2020 with the aim of having the project in production by early 2022.



- **Yanqul**

The Yanqul Project is situated in the Ad Dhahirah Governate of Oman. Lycopodium was appointed by Mazoon Mining Company in September 2018 to manage a Definitive Feasibility Study of this project. The work in progress includes management of consultants as well as work done by Lycopodium in house. An open pit mining operation with a processing plant on site is being investigated.

- **Mt Cattlin**

Lycopodium via Mondium was awarded the design and construction of four new process modules to increase yield optimisation of the Mt Cattlin plant for Galaxy Resources Limited. The works included the optimisation of the existing lithium processing facility with engineering undertaken out of our Perth office with process expertise supported by our Cape Town office. The work was successfully completed in the first half of 2019.

- **Bomboré**

Lycopodium continued its work on Orezone Gold Corporation's (Orezone) Bomboré Project in Burkina Faso. One of the largest undeveloped and fully permitted gold deposits in West Africa. Bomboré is located 85 km east of the capital city, Ouagadougou, adjacent to national paved highway RN4. The work undertaken this year has been in the form of an update to the previous feasibility study which looked at a staged higher-grade sulphide expansion in addition to the oxide mine plan in the 2018 Feasibility Study (FS).

The 2019 update incorporates the combined oxide and sulphide circuits and will be based on an expanded plant throughput of 5.2 Mtpa as opposed to the 4.5 Mtpa used in the 2018 FS. We have kicked off Front End Engineering and Design (FEED) for the oxide phase of the project.

Infrastructure

- **Newcastle Light Rail O&M Support**

Newcastle Light Rail is a high capacity, frequent and reliable service through the city centre, connecting key activity precincts and opening up urban renewal opportunities. Lycopodium was engaged to support the development of the operating and maintenance manuals of the project's infrastructure. Lycopodium authored a material number of the manuals developed for the project and also managed the development of the remaining manuals by other contractors and vendors to ensure the content was of a consistent high quality, meeting the demands of the rail regulator and that of Transport for NSW.

- **Pacific National RIM Services**

Pacific National Corporation (Pacific National) is Australia's largest rail provider, hauling coal, steel, automotive, agricultural, minerals and containerised freight to all mainland states and territories in Australia. Lycopodium continued the provision of its Rail Infrastructure Management (RIM) services for Pacific National, working through its 3 (plus 1) year agreement to inspect, certify and

manage defects at 62 sites Australia wide. Inspections at these sites commenced in April 2018 requiring substantial prior planning and groundwork. RIM services comprise processes and systems to ensure infrastructure is fit-for-purpose, able to support safe and efficient operations. In addition and most importantly, the service ensures risk is managed in accordance with the requirements of rail safety legislation. Pacific National has expanded our scope to include derailment investigations, special or ad hoc inspections and geotechnical investigations.

Industrial Processes

- **Geo40 Silica Extraction Plant**

Lycopodium was engaged by New Zealand-based technology company Geo40 to design and commission a new facility for the extraction of silica from geothermal fluids in the Taupo region of New Zealand. The process extracts silica as a by-product from the heated fluids already being used to produce energy on the Ohaaki geothermal field. Lycopodium performed a preliminary design and a Capital Cost Estimate report in parallel with detail design for the new plant.

- **Magnesium Recovery Plant**

EcoMag Ltd has developed a process to produce high purity Hydrated Magnesium Carbonate (HMC) from the waste streams - known as bitterns - left over from sea-salt production. Lycopodium was engaged to further develop the overall plant design process through a Feasibility Study Report, including a Capital Cost Estimate,

Operating Cost Estimate and Implementation Plan for the detailed design, construction and commissioning phase of the project.

• **CSL Centrifuge Cooling Skids**

In August of 2018, Lycopodium was awarded the contract for the detailed design of centrifuge cooling skids at CSL Behring's Broadmeadows, Victoria facility. The centrifuge system will be part of a new CSL facility to process human plasma into protein-based therapies.

INNOVATION

A key Lycopodium strategic pillar is the pursuit of new and innovative initiatives. Of note in this past year Lycopodium subsidiary company Orway Mineral Consultants (W.A.) Pty Ltd and Process IQ Pty Ltd have formed Orway IQ Pty Ltd, to deliver a remote optimisation consulting service – MillROC (Milling Remote Optimisation Consulting) to the minerals processing industry, initially focussed on comminution circuits. The joint venture draws on Orway Mineral Consultants' (OMC) expertise in comminution design, modelling and optimisation and Process IQ's expertise in the IIoT (Industrial Internet of Things), cloud-based computing, process control, automation and instrumentation.

The joint venture company is aligned with the METS Ignited initiative to assist with the growth and innovation of the business. METS Ignited is an industry-led, government funded, growth centre for the Mining Equipment, Technology and Services (METS) sector. OMC, Process IQ and now Orway IQ are at the forefront of the digital transformation in the

mining industry, having been recognised for their ground-breaking collaborative work in this space receiving a METS Ignited grant to commercialise the product.

HSE AND COMMUNITY

Lycopodium's primary focus is on the health and safety of its staff and all personnel working on its projects. We continue to set and achieve a high standard of health and safety across all our projects and given the highly international nature of our activities we have worked proactively to ensure the security, safety and wellbeing of our personnel wherever they may be.

In 2018/19 there were 4.1 million manhours worked across the Lycopodium managed projects with a zero LTIFR against an 8.1 construction industry average.

On the community side, Lycopodium continued to focus on education as a means of strengthening communities and in line with this remained an active sponsor and supporter of the Clontarf Foundation, a charitable not-for-profit organisation in Australia improving the education, discipline, self-esteem, life skills and employment prospects of young Aboriginal men.

Support was also provided around a key annual event for the Murlpirrmarra Connection, a not-for-profit organisation that exists to provide Aboriginal youth in the remote communities of Wiluna, Leonora and surrounding regions in Western Australia, with educational opportunities.

In terms of industry engagement, Lycopodium retained its platinum sponsorship of the Australian African Mining and Energy Group the peak body representing Australian

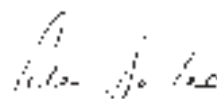
companies engaged in the development of Africa's resource industry.

The Company also continued to provide material support to a number of charitable initiatives championed by staff.

ACKNOWLEDGEMENT

The Board of Directors recognises that the Company's ability to continue delivering world class services to our clients and to maintain and enhance the Company's performance and capability is dependent on the continued commitment and support of our personnel. On behalf of my fellow Directors I take this opportunity to sincerely thank all personnel for their highly valued contribution.

We would also like to thank our clients for their continued trust in Lycopodium to deliver services to their projects and studies. We will as always work hard to maintain these valued relationships.



Peter De Leo
Managing Director

BOARD OF DIRECTORS



MICHAEL (MICK) CARATTI
Non Executive Director



PETER DE LEO
Managing Director



BRUNO RUGGIERO
Executive Director



RODNEY (ROD) LEONARD
Non Executive Director



ROBERT (BOB) OSMETTI
Non Executive Director



LAWRENCE (LAURIE) MARSHALL
Non Executive Director



PETER DAWSON
Executive Director



STEVEN CHADWICK
Non Executive Director



JUSTINE CAMPBELL
Company Secretary/
Chief Financial Officer





SECTORS			SERVICES	LOCATIONS
Resources  <ul style="list-style-type: none"> • Gold and Precious Metals • Base Metals • Battery Metals • Specialty Metals • Diamonds and Gemstones • Bulk Minerals <ul style="list-style-type: none"> - Iron Ore - Mineral Sands - Bauxite 	Infrastructure  <ul style="list-style-type: none"> • Railways • Roads • Ports • Non-Process Resource Infrastructure • Asset Management 	Industrial Processes  <ul style="list-style-type: none"> • Pharmaceuticals • Biotechnology • Chemical and Energy • Food and Beverage • Manufacturing • Research and Development 	 <ul style="list-style-type: none"> • Feasibility Studies • Process Development and Optimisation • Engineering and Design • Project Management and Delivery • Project Services • Construction Management • Commissioning and Operations Support • Asset Management 	 <p>AUSTRALASIA</p> <ul style="list-style-type: none"> • Perth • Melbourne • Newcastle • Brisbane • Manila <p>AFRICA AND MENA</p> <ul style="list-style-type: none"> • Cape Town • Johannesburg <p>AMERICAS</p> <ul style="list-style-type: none"> • Toronto

TRYING TO DEFINE LYCOPIDIUM

What do the following have in common:

- *Producing biodiesel from animal tallow*
- *Recovering magnesium salts from solar salt fields*
- *Producing Ultra High Purity Alumina for use in lithium batteries*
- *Producing morphine from poppy seed*
- *Designing part of the NSW Country Rail Network*
- *Precision installation of equipment for the Australian Synchrotron Project*

They are all technically challenging, mostly at the pointy end of science and mostly requiring the application of a great depth of understanding to convert an idea into a reality.

They are also all projects that have been completed by Lycopodium.

We have spent some time discussing internally how to define exactly what Lycopodium does. Whereas once we could be easily defined as gold project specialists, we are now much more than that.

The diversity of sectors within which we now work - covering resources, industrial processes and infrastructure; the broad and truly fascinating range of projects that we are involved with - most minerals and metals, hazardous and toxic chemical processes, emerging technologies, R&D; and the breadth of knowledge and experience that we need to apply in solving technical problems associated with these projects - these are all factors that contribute to a much broader definition of what Lycopodium does.

Taking all of these factors into account we believe the appropriate definition for Lycopodium is that we commercialise science.

We take the science around a project, the chemistry and the physics, and as the interface between science and engineering, use our skills to convert the science into a commercial reality.

BUILDING ON EVERYTHING THAT IS GOOD

We have built our reputation over the past three decades by successfully delivering many projects, mostly outside Australia, and in some very difficult jurisdictions. We have been challenged by logistics, climate, cultures and language, we have been challenged by ownership structures, tax structures and contracting arrangements. Despite these challenges, we have managed to deliver all of our projects on time, on spec, on budget, and most importantly

- profitably. We define the risks for our client and before we take a job on, we define the risks that will be borne by our shareholders.

We like to think that our approach is cautiously courageous.

We are not put off by geography, jurisdiction or technology. We are confident in our ability to manage the risks associated with process development, engineering and project delivery. We are equally confident in our ability to identify the risks we are not able to properly manage. This approach has stood the test of time and placed us among the top project delivery engineers in Australia, Africa and Asia.

We continue to build upon everything that is good about that approach.

Those core skills we applied in the early days have evolved into services that we now provide across multiple sectors.



Our clients are global and cover both private and public listed companies.

THE BUSINESS

Locations

Ours is a global business. Within Australia we have offices in Perth, Melbourne, Newcastle and Brisbane. We also have offices in Toronto, Cape Town, Johannesburg and Manila.

Clients

Our clients are global and cover both private and public listed companies. Among listed companies, our clients cover the full range from small juniors, through mid-tier and ultimately to the majors. We occupy a unique position in the engineering market in that we have both the systems and processes necessary to service Tier 1 clients, but also with the flexibility to provide simplified processes for junior and mid-tier clients.

This is a very deliberate strategy – many of our original junior clients have been acquired by majors or have themselves evolved into mid-tier companies. We have grown with them so we too continue to support the junior companies as they move along their own growth trajectory.

Sectors

Lycopodium operates within the Resources, Industrial Processes and Infrastructure sectors.

- Within Resources we cover all commodities and minerals other than coal. We are recognised globally for our capability in gold, copper and diamonds.
- Within Industrial processes we cover markets such as pharmaceuticals and biotechnology, food and beverage, chemicals and energy, sustainability and environment.
- Within Infrastructure we cover predominantly road, rail and ports plus asset management services to government infrastructure.

Services

As mentioned earlier, our purpose is to commercialise science. The services we offer in commercialising science are independent of and

completely transferable between any of the sectors we operate within. Although some of our offices carry higher or lower numbers of professionals within any service, the global nature of our business means we can deliver the requisite service in the requisite sector wherever it is required.

The following section provides a summary of our services.

Feasibility studies and advisory

Feasibility studies and our associated advisory services are the heart of our business, where we throw big-picture ideas around in concept development and preliminary economic analysis. It's where we solve problems, refine and reduce options during pre-feasibility and, ultimately, deliver certainty through feasibility studies.

It is during the feasibility study that we are able to deliver the greatest value to our clients. An error in process selection or project definition at this early stage is amplified many times over as the project develops and can ultimately be fatal for the project and sometimes for the client. This is the responsibility we carry at this early stage.

Quality engineers like Lycopodium differentiate themselves from the pack with this service. We have a fine track record for preparing studies that are technically and commercially sound while being fit-for-purpose and matching the client budget.

The purpose of our feasibility studies is to help our clients move forward with clarity and confidence. We do all that we can to help them move forward.

Process development and optimisation

The success of industrial processes and resource projects revolves around process development and optimisation. We arguably have some of the best teams in the world working with clients around the globe covering mineralogy, metallurgy, chemistry,



contaminant management and environmental management, among other things.

Whether it's an 85 Mtpa copper concentrator in Panama or a 5 tpd polymeric anti-microbial plant in Australia, process development is the first and most critical step in commercialising the science for a project. Commercial success can only be achieved if the correct flowsheet is developed to match inputs and outputs.

At Lycopodium, we spend our working lives developing new ways to maximise recovery, reduce operating costs, de-bottleneck processes and improve capital efficiency. Through this focus we are able to help our clients extract maximum value from their operating assets.

Engineering and design

With age comes wisdom. We have learned many engineering lessons delivering projects in cold climates and desert plains, in tropical jungles and dangerous surf zones. We are continually learning from our experiences, adapting and improving our engineering as new materials come onto the market, new equipment becomes available and new technologies roll out.

In addition to capturing our tacit knowledge from the field, we are heavily invested in preserving our explicit knowledge by being part of the forward group in the evolution of digital engineering. We are not ahead of the curve (nor do we want to be). However, we are adopting proven, leading digital platforms and packages to ensure we are among the leaders in our field.

We use digital engineering to create a digital representation of the project. Building Information Modelling (BIM), is the process of creating information models containing both graphical and non-graphical information in a shared repository for digital project information. We are pursuing an integrated BIM strategy which will see 4D BIM (Construction sequencing), 5D BIM (Cost) and 6D BIM (Project lifecycle information) being adopted.

BIM remains an evolving platform in the engineering sector and we will continue to be part of this evolution.

Project management

It's a matter of policy that we manage all our projects in a manner that will not cause our employees, contractors or the general public harm or jeopardise anyone's health. Furthermore, our HSEC policy ensures we minimise our impact on the environment.

Our project management expertise encompasses many things, including but not limited to project execution and procedure planning, contract and document management, industrial relations contract negotiation, contractor management, schedule coordination, plant commissioning and operator training.

These skills help deliver a good project for our clients.

With increasing global awareness of social and cultural issues, our client's access to funding and project success depends more than ever on our ability to address social risks and impacts during project design and construction. We're committed to developing and fostering long-term relationships with local and regional contractors, leveraging local contractors' expertise wherever possible, and encouraging local economic growth.

These skills help deliver a good project for local communities.

We take all practicable steps to achieve zero injuries and zero environmental impact, leaving only positive legacies within the communities in which we work.

Project controls

Good project controls help manage risks for our clients – they also manage risks for Lycopodium.

Our project controls and project management procedures provide the client and us with transparency on, among other things, budget

management, change management, commitments, forecasting, tracking and commissioning. These few measures represent a single source of truth for project delivery performance, allowing problems or delays to be identified and mitigating steps to be put in place. Our good project controls are essential for good business.

Commissioning and operations support

Our process and design engineers are always part of the commissioning team – it's the Lycopodium way. We see, touch and feel the consequences of our decisions. This intimate knowledge means our plants ramp up to name-plate capacity quickly and transition to operating staff seamlessly. As mentioned earlier, the tacit knowledge gained from having our process and design engineers as part of the commissioning team ensures continuous improvement with all lessons learned 'brought back' to the business and where necessary, captured in future designs.

We believe we have the best track record out of any Australian engineer (modesty prevents us claiming a wider geography) for bringing projects up to



and maintaining name plate capacity in the shortest time. The impact on cashflow for our clients by achieving production ahead of schedule is enormous and contributes materially to the repeat business we have enjoyed with so many clients.

Process control and optimisation

The fourth wave of the industrial revolution, known as Industry 4.0, has brought the opportunity for Lycopodium to leverage further the depth of scientific and engineering knowledge we have around chemical and resource processes. By leveraging big data and analytics, automation, advanced hardware and machine learning with cloud computing, we are moving into the space of data driven mining decisions and to creation of ‘Smart Mines’.

Our wholly owned subsidiary - OMC, has entered into a joint venture with a technology provider – ProcessIQ, to develop a digital twin of grinding circuits. The joint venture is called MillROC.

OMC is a global leader in grinding circuit design and optimisation. ProcessIQ is a leader in digital platforms, big data and the Industrial Internet of Things (IIoT).

By combining the grinding circuit IP with the right cloud-based digital platform, MillROC is able to create a digital twin of the client's grinding circuit. Changes in control parameters can be made to the digital twin and

the model run to establish whether such changes improve circuit performance. If they do, real time recommendations can be made to the client to optimise actual mill performance.

Asset management

In the sectors that we cover, the purpose of asset management strategies is to ensure the assets can be maintained and operated within their rated design window for as long as possible. By helping our clients track asset performance and monitor where the asset sits within its operating window, we are able to help clients plan for shut downs rather than have them respond to failures.

By assisting with the long term best interests of the client we also hope to continue our relationship with a project beyond commissioning and into operations, a transition from project based revenues for Lycopodium into annuity based revenues.

OUR PEOPLE

Like all good organisations we try very hard to attract and retain the best and brightest. We would like to think that we are up there among the best as an employer but we know there is always a need for continuous improvement, adapting to the changing needs of society, demographics and expectations. It is something we take

very seriously and strive to maintain the highest standards.

We believe it takes different people to make a difference.

We encourage broad perspectives and differences of opinion. We like to empower people early in their careers and expose them to responsibility, we like our people to have lots of field experience and practical knowledge. That is how the company began and it is the type of culture we wish to retain.

Out of this culture a term has evolved. The term is ‘Lycopod’.

It is a term created by people who work within the business, it was not created by management nor by shareholders. The following is how a Lycopod has been defined:

It is an endearing term for the people in our organisation, who are confident and capable when assigned a task and are culturally aligned to Lycopodium's values. It should be noted that Lycopods have a range of personalities and demeanours. Whilst there is a requirement for professionalism at all times, Lycopods are not conformists and are not all from the same mould.

We like the definition and hope you do too.





PROJECT EL LIMON UPGRADE PROJECT

Client: B2Gold Corporation
Location: Nicaragua
Sector: Resources – Gold

Founded in 2007 and headquartered in Vancouver, B2Gold Corporation (B2Gold) has five operating gold mines, and numerous exploration and development projects in various countries including Nicaragua, the Philippines, Namibia, Mali, Burkina Faso, Colombia and Finland.

In recent years, Lycopodium has worked with B2Gold on their Fekola, Masbate and Otjikoto sites; this reporting year Lycopodium is providing engineering services for a planned upgrade of the El Limon mine process plant in Nicaragua.

El Limon is in north western Nicaragua, approximately 100 km north west of the country's capital, Managua. It is a historic mine, in operation as an underground and open pit mine since 1941. When B2Gold assumed ownership of El Limon in 2009, the mine was operating with an aged mill and mining equipment and the company embarked on a programme of exploration and investment to renew the production fleet, the process facility and the mine infrastructure.

From its Toronto office, Lycopodium is providing detailed engineering services relating to an upgrade of the comminution circuit at the existing El Limon process plant. The scope involves upgrading the cyclone classification system of the grinding circuit to process 500 ktpa of ore. The upgrade is part of a potential future expansion to process 600 ktpa through a tertiary grinding circuit. The equipment will be sized, and the design undertaken, to accommodate the potential future expansion.



Again working closely with the B2Gold site team, Lycopodium's scope of services includes Project Management, Process Engineering, Mechanical Engineering, Civil / Structural Engineering and Electrical / Instrumentation Engineering.

According to an independent study in 2017, by developing just 0.3% of Nicaragua's land, the mining sector has been able to double gold production in the last 11 years and today gold is the nation's third largest export.

A country with a long mining history, Nicaragua is open to responsible mining and offers the advantages of a modern mining law, low crime rate and excellent infrastructure.





PROJECT *ITY CIL*

Client: Endeavour Mining Corporation
Location: Côte d'Ivoire
Sector: Resources – Gold

Endeavour Mining Corporation (Endeavour) is a gold producer operating four mines: Agbaou and Ity in Côte d'Ivoire with Houndé and Karma in Burkina Faso. Lycopodium has worked with Endeavour on the development of all these sites.

Ity, located approximately 700 km northwest of Abidjan, which serves as Côte d'Ivoire's economic capital and has the longest history of any gold mine in Côte d'Ivoire, producing more than 1.2 million ounces of gold over more than 25 years of production.

Initially, Endeavour operated the project using open pit mining methods and a heap leach process for gold recovery. In 2016, Lycopodium undertook the lead role (study coordination, metallurgy, process plant and infrastructure design) on a Technical Report, that confirmed the results of an earlier Feasibility Study (FS).

The report established that with the construction of a new gravity circuit / CIL (carbon-in-leach) plant, the Ity mine could become another Endeavour long-life low-cost asset, expected to deliver an average production of 114,000 ounces per year over a 14-year mine life.

In 2017, Endeavour committed to construction of the project, with Lycopodium providing EPCM services, to what was predominantly a greenfields site, with a scope of process design, engineering design, procurement, construction management and commissioning of a gold CIL plant, capable of 4 Mtpa of a blended gold bearing ore.

In 2018, Endeavour requested Lycopodium undertake a debottlenecking review of the Ity mine plant design to increase the plant nameplate capacity by 1 Mtpa to 5 Mtpa. The study focused on achieving the increased throughput at a cost of \$10-15 million, with minimal disruption to the plant whilst in operation. Endeavour committed to the upgrade in the third quarter on 2018 with engineering and procurement working in parallel of construction.

In March 2019, Endeavour announced to the markets that the first gold pour of approximately 1,800 ounces of gold had been achieved, four months ahead of schedule.

Three weeks later, in April 2019, a further announcement confirmed that commercial production had been achieved at full nameplate capacity of 4 Mtpa following a quick ramp up phase. At the same time, with the performance tests having been conducted, Endeavour launched optimisation

and debottlenecking work which is expected to increase the plant nameplate capacity by 1 Mtpa to 5 Mtpa. The work mainly comprises an upgrade in pipes and pumps, and a second 50-tonne oxygen plant. These plant upgrades are expected to be completed during scheduled plant maintenance shut downs throughout 2019.



PROJECT TOKA TINDUNG

Client: PT Tambang Tondano Nusajaya /
PT Archi Mining Indonesia
Location: Indonesia
Sector: Resources – Gold

PT Archi Indonesia (Archi), an Indonesian based gold mining company, has a 100% stake in the Toka Tindung project, a small gold and silver mine located on the northern tip of the island of Sulawesi, Indonesia. Bordered by the Malucca and Celebes seas, it is approximately 35 km northeast of the regional capital of Manado.

First commissioned by Archi in 2011, by 2014 it was estimated the deposit still had 2.7 million gold equivalent ounces resources and 1.3 million gold equivalent ounces reserves.

Over the past few years Lycopodium has been working with Archi to upgrade the plant processing facilities at Toka Tindung site. From March 2017 through to November 2018, we provided EPCM services for a throughput upgrade (from 2.4 Mtpa) to 3 Mtpa of the process plant facilities which involved detailed design, procurement and construction management services. The upgrade was successfully executed within budget and schedule, with Practical Completion achieved 1 November 2018.

Mine planning by Archi identified that in order to maintain gold production targets throughput would need to be expanded further to 3.5 Mtpa. In June 2018, Lycopodium provided engineering services conducting the study for the second phase of the process plant expansion to 3.5 Mtpa.

This assignment was for concept level studies to identify and address potential bottlenecks in the expanded plant flowsheet and to specifically investigate gold recovery improvement and plant capacity increase. The intent of the desktop options studies was to identify and select a single option in each case for more definitive engineering and costing such that this can progress directly to the front end engineering design (FEED) stage, allowing rapid implementation if approved.

This study was delivered to Archi in February 2019.





PROJECT WAHGNION

Client: Teranga Gold Corporation
Location: Burkina Faso
Sector: Resources – Gold

In 2016, Teranga Gold Corporation (Teranga), a Canadian based gold company, completed the acquisition of Gryphon Minerals, adding the Wahgnion (formerly Banfora) gold asset to its portfolio. Wahgnion is located in south west Burkina Faso, 510 km south west of the capital, Ouagadougou, close to the borders of Côte d'Ivoire and Mali.

In November of that year Teranga engaged Lycopodium to complete a Feasibility Study (FS) for the process plant and infrastructure portions of the Wahgnion project with a scope of work that included detailed technical and economic assessments of the feasibility of developing a 2.0 to 2.7 Mtpa (average LOM throughput rate of 2.5 Mtpa) gold mining operation.

Plant design is based on a conventional carbon-in-leach (CIL) gold process flowsheet consisting of primary crushing, semi autogenous grinding and ball milling, with a pebble crusher, CIL gold extraction, elution, electrowinning, and gold smelting to produce doré on site.

In late 2017 Teranga awarded Lycopodium a contract to provide EPCM services for the process design, engineering design, procurement, construction management and commissioning of the process plant for Wahgnion. Engineering design has also been completed for support infrastructure including the accommodation village.

As at June 2019, with construction nearing completion, the project is on budget and on schedule with an excellent health and safety record. Commissioning of the process plant is in progress with the first gold pour expected in 3Q2019 with production ramp up in 4Q2019.



PROJECT ESSAKANE MILL DEBOTTLENECKING AND HEAP LEACH

Client: IAMGOLD Corporation
 Location: Burkina Faso
 Sector: Resources – Gold

The Essakane project is located in north-eastern Burkina Faso, West Africa, approximately 330 km northeast of the capital, Ouagadougou. It is situated 42 km east of the nearest large town and the provincial capital of Oudalan, Gorom-Gorom.

IAMGOLD Corporation (IAMGOLD) is a TSX-listed Canadian gold producer headquartered in Toronto, Canada with four operating gold mines in three continents. IAMGOLD commenced management of the Essakane project in February 2009 with commercial production beginning in July 2010. Essakane ore is processed using two stage crushing, SABC grinding and carbon-in-leach (CIL) gold plant. A mill expansion was completed in 2014 which increased the plant to nameplate mill capacity of 10.8 Mtpa.

IAMGOLD has conducted a number of investigations to debottleneck the Essakane operation; the studies have focussed on identifying equipment throughput constraints for various plant throughput scenarios. The major area of focus has been the crushing and grinding areas, with additional investigations into the CIL, tailings handling, water balance, and lime addition circuits. It is also investigating the potential of heap leaching.

To familiarise themselves with the operations, three Lycopodium personnel from the Toronto office were invited to the mine site to clarify aspects of the proposed design and conduct a review of the locations where modifications are possible.

In November 2018, IAMGOLD requested Lycopodium to conduct a Feasibility Study (FS) on selected portions of the



overall debottlenecking project. The main objective for Lycopodium was to study the proposed changes to target an increase in plant nameplate capacity. Also incorporated in this work, at IAMGOLD's request, Lycopodium undertook additional supplementary study work reviewing data, prices and specifications.

Lycopodium is also undertaking a FS for a heap leach facility, associated infrastructure and necessary modifications to the existing Essakane facilities. Using a phased approach, this assignment is investigating the conversion of the site to a large low grade heap leach operation when the current CIL plant runs out of high grade feed.

Lycopodium is also providing construction management and field engineering support to IAMGOLD on-site construction personnel.





PROJECT MINA DE COBRÉ PANAMA

Client: Minera Panama / First Quantum Minerals Ltd
Location: Panama
Sector: Resources – Copper, Gold, Molybdenum

During 2018/19 Lycopodium continued working on the Cobré Panama project for First Quantum Minerals Ltd (FQML), furthering an extended and effective association with FQML on various projects in Australia and Africa.

Through its Panamanian subsidiary, Minera Panama S.A., FQML is developing this large concession. The project involves the largest unit processing equipment in the world and Lycopodium has worked collaboratively with FQML to support its project development style along with budget and schedule targets.

Awarded the project in 2013, Lycopodium's scope of services was to carry out the process, earthworks, architectural, civil, structural, mechanical and piping detailed engineering design as well as providing technical input into the procurement process for the construction of the process plant, services and associated infrastructure.

By the end of 2018, construction of Cobré Panama was almost complete, with project ramp up scheduled to start in 2019. Construction and commissioning of the power station is complete. A priority for the project team is the completion of all construction and commissioning of key process plant facilities.

Over the past year, Lycopodium has completed the process plant design and the services to non-process infrastructure buildings as well as providing some field engineering and plant commissioning support personnel in Panama. As of May 2019, the design scope of work is complete and support is continuing for construction, commissioning and ramp up with a design team mobilised to site.

The project involves mining from open pits, overland conveyor transportation, a concentrator treatment plant with the concentrate being pumped 25 km to a port area for filtration and export.

Expectations are that the project will have a mine life of 40 years.

The topography in the concession area is low elevation but rugged, with considerable local relief covered by dense rainforest. Climatic conditions are tropical with high precipitation levels, high humidity and temperatures of 25°C to 30°C year-round.



PROJECT BOTO

Client: IAMGOLD Corporation
 Location: Senegal
 Sector: Resources – Gold



In October 2018, IAMGOLD Corporation (IAMGOLD) announced to the markets positive results from the Feasibility Study (FS), for its Boto Gold Project in Senegal, West Africa. This FS, completed jointly by IAMGOLD and Lycopodium, outlined an economically robust project with an anticipated low cost of production and long operating life.

The study confirmed the preferred development approach to be a conventional truck and shovel open pit mining operation with a mineral processing circuit incorporating primary crushing, grinding and cyanide leaching, followed by gold recovery using carbon-in-pulp, stripping and electrowinning.

IAMGOLD will use the Feasibility Study to support an application for a mining concession submitted in the fourth quarter of 2018, with approval expected in 2019. In the interim, IAMGOLD decided to continue to optimise aspects of the project design.

In February 2019, after a competitive tendering process, Lycopodium was issued with a Letter of Intent by IAMGOLD appointing Lycopodium as the preferred EPCM partner for the Boto execution stage, pending a decision to construct.

In May 2019 Lycopodium commenced work on a study update looking at further optimisation of the Boto plant and infrastructure to advance the engineering of the Boto plant with a revised throughput of 3.0 Mtpa. This work is expected to continue until 2H19.

Work on this project continues Lycopodium's experience of gold plant design and project execution in West Africa, and specifically, Senegal through execution of the Mako and Sabodala Expansion projects.

PROJECT BOMBORÉ

Client: Orezone Gold Corporation
 Location: Burkina Faso
 Sector: Resources – Gold



Orezone Gold Corporation (Orezone) is a Canadian exploration and development company which has a 90% interest in the Bomboré deposit in Burkina Faso, one of the largest undeveloped and fully permitted gold deposits in West Africa. Bomboré is located 85 km east of the capital city, Ouagadougou, adjacent to national paved highway RN4.

The project has a large near surface free dig oxide deposit which requires no crushing, minimal grinding and is amenable to simple CIL gold recovery. The Company plans to develop the oxides as a stage one development. The project benefits from a large underlying sulphide orebody that has been drilled and studied, and Orezone has recently updated its 2018 Feasibility Study (FS) to incorporate the sulphide expansion to complement the initial oxide development.

This update is being managed by Lycopodium from its Toronto office and includes a staged higher-grade sulphide expansion in addition to the oxide mine plan in the 2018 FS. The 2019 update incorporates the combined oxide and sulphide circuits and will be based on an expanded plant throughput of 5.2 Mtpa as opposed to the 4.5 Mtpa used in the 2018 FS. The sulphide plant will be constructed in Year 2 of oxide operations and sulphide feed will commence in Year 3 at a planned rate of 2.2 Mtpa.

The FS was completed at the end of 2Q2019, and Lycopodium provided an update of the historical metallurgical testwork, comminution options study, process design, engineering, drafting and estimating services associated with processing of lower transition / sulphide ore through a circuit to be integrated with the Bomboré oxide processing facility previously studied.

In addition, Lycopodium is undertaking Front End Engineering and Design (FEED) for the oxide phase of the project.



PROJECT TOLIARA

Client: Base Toliara / Base Resources
 Location: Madagascar
 Sector: Resources – Mineral Sands

Base Resources (Base) is an Australian based, African focused, mineral sands producer and developer that operates the established Kwale Operation in Kenya. Its subsidiary, Base Toliara, is developing the Toliara project in Madagascar which will produce ilmenite, zircon and rutile.

Located in south west Madagascar, 50 km north of the regional town and port of Toliara the project is underpinned by the large, high grade Ranobe deposit.

In March 2019 Base released to investors the outcomes of a Pre-feasibility Study (PFS) on this project, with Base’s Managing Director, Tim Carstens, announcing *“that the Toliara Project is one of the best mineral sands development opportunities in the world”*.

Work now moves to the advancement of the Definitive Feasibility Study (DFS) which will determine project design, execution planning and financing and which is due to be completed by late 2019. A final investment decision is expected to be given by Base in the first half of 2020 with the aim of having the project in production by early 2022. In full production, Toliara will export over 860 kt of product, generating around US\$250M of revenue annually. Development of the project will involve the construction of processing facilities at the mine site, a dedicated 46 km haulage road, a bridge across the Fiherenana River and specialised port facilities.

Using the PFS as a basis, Lycopodium, in conjunction with Mineral Technologies, is managing the production of the DFS with a scope of services that will see the completion of all work necessary to provide a complete DFS for the project.



The areas being considered in the study include all camp accommodation facilities, the mining and processing plants, all plant infrastructure and ancillary services to support the construction and operation of the processing plants, as well as major infrastructure including borehole well field development, product haul road and bridge, and a product handling, storage and out-loading facility at the new port.

Works commenced for Lycopodium on site in June 2019 with geotechnical and geophysical investigations. Later this year an Early Works programme will commence which will establish site construction access and accommodation block work.

PROJECT YANQUL COPPER-GOLD FEASIBILITY STUDY

Client: Mazoon Mining Company
 Location: Oman
 Sector: Resources – Copper-Gold

The Yanqul Project is situated in the Ad Dhahirah Governate, approximately 50 km north of Ibri in northwest Oman. An open pit mining operation with a processing plant on site is being investigated.

Various studies have been conducted on the Yanqul Project including a JORC Resource Assessment and a preliminary feasibility study. Lycopodium was appointed in September 2018 to manage a definitive feasibility study of this project. The work in progress includes management of consultants as well as work done by Lycopodium in-house. Scope includes infill resource drilling and definition, mine planning, metallurgical testwork, metallurgical process definition and design, infrastructure and tailings disposal investigations and cost estimates to the level appropriate for a feasibility study.



PROJECT GEO40 SILICA EXTRACTION PLANT

Client: Geo40 Pty Ltd
 Location: Ohaaki New Zealand
 Sector: Industrial Processes – Chemical



Lycopodium was engaged by New Zealand-based technology company Geo40 to design and commission a new facility for the extraction of silica from geothermal fluids in the Taupo region of New Zealand. The process extracts silica as a by-product from the heated fluids already being used to produce energy on the Ohaaki geothermal field. Once extracted, the silica becomes a marketable specialty product, used in myriad products from paints to manufacturing golf clubs. The process itself also benefits the local environment as it comes with a much lower carbon footprint due to nature doing all the work in dissolving the silica.

Geo40 had an existing contract with New Zealand's Contact Energy and Ngati Tahu Tribal Lands Trust to build a Commercial Demonstration Plant, which was commissioned in April 2018. Having demonstrated the feasibility of the technology, they are now scaling up the operations to greater capacity in partnership with Lycopodium.

Lycopodium performed a preliminary design and a Capital Cost Estimate report in parallel with detail design for the new plant, along with providing an independent team who conducted a Technical Review of the documentation supporting the detail design and capital cost estimate. Lycopodium has performed civil, structural, mechanical, piping, electrical and instrumentation design and developed contractor scope of works and custom specifications for Geo40, and has chaired design reviews, HAZID and HAZOP of the Geo40 process. Furthermore, Lycopodium is performing procurement evaluation and selection recommendations for all site contracts and equipment suppliers, and will provide commissioning assistance to Geo40.

PROJECT CSL CENTRIFUGE COOLING SKIDS

Client: CSL Behring Ltd
 Location: Victoria
 Sector: Industrial Processes – Pharmaceutical

In August of 2018, Lycopodium was awarded the contract for the detailed design of centrifuge cooling skids at CSL Behring's Broadmeadows, Victoria facility. The centrifuge system will be part of a new CSL facility to process human plasma into protein-based therapies.

The centrifuge system consists of two separate components: the centrifuge which performs the physical separation of the product and the centrifuge control skid which monitors and controls the flow of product and services to and from the centrifuge. The centrifuge cooling skid connects to the centrifuge control skid and distributes chilled coolant to the cooling circuits on the centrifuge system.

Lycopodium was engaged to design 4x centrifuge cooling skids consisting of all relevant instrumentations, valves, vessels, heat exchangers, pumps and motors, with all items mounted on a skid. The scope of works also included all necessary dimensioned drawings, including 3D CAD drawings, along with Functional Design Specification and flowpaths / coloured P&IDs for the centrifuge cooling skids.





PROJECT BONASIKA

Client: JDS Energy & Mining / GINMIN / First Bauxite Corporation
 Location: Guyana
 Sector: Resources – Bauxite



The greenfield Bonasika bauxite project is being developed by Guyana Industrial Minerals (GINMIN) near Georgetown in Guyana. Estimated to have a mine life of 25 years, the project will process 350,000 tonnes of raw bauxite a year, for use in sintered bauxite products.

In June 2018, Lycopodium was awarded the contract for the provision of the following:

- Detailed engineering and drafting services for the process plant, on-site infrastructure, and port facility.
- Technical procurement support with the preparation of specifications and datasheets for equipment tender documentation within Lycopodium's battery limit.
- Vendor technical data and information management and review.

The Bonasika mine will utilise conventional open-pit mining method to recover ore which will first be crushed, washed, screened and stockpiled at the mine site before being hauled to the Sand Hills port approximately 21 km away from the deposits.

At the Sand Hills port, the ore will be further reduced in size, screened and stored in coarse and fine stockpiles before being reclaimed and loaded onto ships for direct shipment to customers.

PROJECT KARRATHA MAGNESIUM RECOVERY PLANT

Client: EcoMag Pty Ltd
 Location: Western Australia
 Sector: Industrial Processes – Chemical

EcoMag Ltd has developed a process to produce high purity Hydrated Magnesium Carbonate (HMC) from the waste streams - known as bitterns - left over from sea-salt production, in which the initial downstream products will be High Density Hydrated Magnesium Carbonate (HDHMC) and Caustic Calcined Magnesia (CCM).

EcoMag has already confirmed the process technology in a pilot plant with 100 tonnes per annum of production capacity, and now plans to build an 80,000 tonne per annum (based on HMC) production facility located near Karratha in northern Western Australia where the bitterns' stream resource availability offers the potential to produce 800,000 tonnes per year.

Lycopodium was engaged to further develop the overall plant design process through a feasibility study report, including a capital cost estimate, operating cost estimate and implementation plan for the detailed design, construction and commissioning phase of the project.

PROJECT NEWCASTLE LIGHT RAIL

Client: Downer EDI Limited
 Location: New South Wales
 Sector: Infrastructure – Asset Management

Newcastle Light Rail is a high capacity, frequent and reliable service through the city centre, connecting key activity precincts and opening up urban renewal opportunities.

The Newcastle Light Rail is a key part of the Revitalising Newcastle programme, established to deliver the NSW Government’s commitment to revitalise the city. The programme aimed at bringing people back to the city centre by strengthening connections between the city and the waterfront, creating employment opportunities, providing more public space and amenity, and delivering better transport.

Managing Contractor for the project, Downer EDI Limited (Downer) commenced work in August 2016 with a role to design, construct and commission 2.7 km of light rail track, six light rail stops, a stabling and maintenance facility, road works and associated precinct works.

Downer is a provider of services to customers in markets including: Transport Services, Rail, Mining, Utilities Services, Technology and Communications Services, Engineering, Construction and Maintenance.

Major construction of the light rail finished in late 2018, and services began operation in February 2019 with a new fleet of six light rail vehicles with air conditioning and an accessible low-floor design.

Lycopodium was engaged to support the development of the operating and maintenance manuals of the project’s infrastructure. We authored 18 of the 49 manuals developed for the project and also managed the development of the remaining manuals by other contractors and vendors to ensure the content was of a consistent high quality, meeting the demands of the rail regulator and that of Transport for NSW.

The team consisted of a number of Lycopodium’s asset management specialists from across the organisation’s offices working alongside vendors, contractors and constructors. The work involved compiling detail into plain English to not only meet the technical demands of the scope but also the expectations of the various readers of the documents in varying roles in the operator’s organisation.



PROJECT MONTEPUEZ RUBY RECOVERY PLANT

Client: Gemfields
 Location: Mozambique
 Sector: Resources – Gemstones



In late 2018 Lycopodium (via ADP Marine and Modular) completed the installation of the MRM Ruby Recovery Plant.

The final recovery was designed to incorporate Binder Machine (UV-sorting) technology to recover rubies from DMS concentrate that was produced from processing both primary and secondary alluvial ore bodies.

Concentrate emanating from the DMS cyclone spigot (sinks) is jet pumped to the final recovery sizing screen at 2 tph. The sizing module produces three size fractions that is stored in separate bins before processing. The three size fractions are simultaneously (at different feed rates) jet pumped up to the fourth floor to be processed in parallel.

After the concentrate streams passed over a drain screen, the material is dried by means of infrared driers ahead of the Binder sorting machines. The coarse, mids and fines are treated through dedicated streams running through to Binder units that are pre setup with the appropriate algorithm for each size fraction. Concentrate is accumulated in hoppers fitted with tube feeders ahead of the glove boxes where final picking takes place.

The entire process flow is controlled from a central SCADA system with a workstation located in the main control room on the second floor in the process plant. Climate control for the recovery building as a whole is carefully controlled via a central HVAC system.

This process plant was designed to fit into 36 modules all of which have the same outer dimensions and this being the same as a standard 6 m high cube container. The various modules are fitted with 60 mm thick fire resistant insulation panels that are secured into place by means of riveting a bent up U-channel frame into the main box structures. This enables the end user to remove a wall should major maintenance be required.



PROJECT **MT CATTLIN YIELD OPTIMISATION**

Client: Galaxy Lithium Australia Limited
Location: Western Australia
Sector: Resources – Lithium

Mondium was awarded the design and construction of four new process modules to increase yield optimisation of the Mt Cattlin plant. The works include optimisation of the existing lithium processing facility, which runs at 1.6 Mtpa, to increase production and quality of yield and reduce process water usage by way of various process upgrade opportunities in the ultrafines, secondary floats, optical sorting circuits, dewatering and other areas.

An EPC contract for the design, engineering, construction and commissioning of the following circuits within an operating plant environment:

- Fines recovery circuit including wet high intensity magnetic separation (WHIMS)
- Secondary floats re-liberation circuit
- Optical sorting circuit
- Process water upgrade
- Miscellaneous brownfield plant modifications/upgrades



	<i>Consolidated</i>	
	2019 \$	2018 \$
Revenue	154,033,409	194,531,157
Employee benefits expense	(66,674,748)	(67,562,580)
Depreciation and amortisation expense	(1,452,682)	(1,228,479)
Project expenses	(5,488,508)	(5,338,038)
Equipment and materials	(18,418,452)	(23,838,936)
Contractors	(32,128,652)	(41,753,703)
Occupancy expense	(8,111,165)	(8,577,494)
Impairment of goodwill	-	(1,095,048)
Other expenses	(12,164,121)	(8,793,785)
Warranty provision reversal / expenses	13,361,009	(12,080,213)
Finance costs	(72,270)	(120,741)
Share of net profit of associate and joint venture accounted for using the equity method	659,932	1,112,681
Profit / (Loss) before income tax	23,543,752	25,755,489
Income tax (expense) / benefit	(7,144,537)	(7,096,593)
Profit / (Loss) for the year	16,399,215	18,658,896
Dividend (fully franked) (cents)		
Interim	15.0	12.0
Final	15.0	18.0
Total Dividend	30.0	30.0
Shares on issue	39,732,373	39,732,373
(\$) Share price as at 30 June	4.84	4.65
Earning per share (cents)	41.5	46.6
Price earnings ratio	11.7	10.0
Net tangible assets per share (cents)	182.9	182.6

	<i>Consolidated</i>	
	2019	2018
	\$	\$
ASSETS		
Current assets		
Cash and cash equivalents	60,451,048	74,287,788
Trade and other receivables	34,394,839	37,616,637
Contract and other assets	-	2,669,078
Inventories	884,337	819,844
Current tax receivables	1,783,966	1,334,151
Other current assets	3,835,651	1,740,851
TOTAL CURRENT ASSETS	101,349,841	118,468,349
Non current assets		
Investments in listed equities	801,945	1,256,106
Property, plant and equipment	3,768,452	3,434,487
Intangible assets	6,737,447	6,792,017
Other receivables	241,252	332,356
Deferred tax assets	4,062,995	8,350,798
Investments accounted for using the equity method	1,392,465	2,767,690
Total non current assets	17,004,556	22,933,454
Total assets	118,354,397	141,401,803
LIABILITIES		
Current liabilities		
Trade and other payables	26,049,056	23,147,178
Contract and other liabilities	8,185,494	11,271,131
Borrowings	419,344	696,905
Derivative Financial Liabilities	163,044	27,694
Current tax liabilities	494,412	9,568,881
Provisions	3,000,000	16,361,009
Total current liabilities	38,311,350	61,072,798
Non current liabilities		
Borrowings	296,216	562,066
Provisions	328,931	416,531
Total non current liabilities	625,147	978,597
Total liabilities	38,936,497	62,051,395
Net assets	79,417,900	79,350,408
EQUITY		
Contributed equity	20,823,772	20,823,772
Reserves	(602,928)	(930,627)
Retained profits	59,636,154	56,480,343
Parent entity interest	79,856,998	76,373,488
Non-controlling interests	(439,098)	2,976,920
Total equity	79,417,900	79,350,408

SHAREHOLDER INFORMATION

The shareholder information set out below was applicable as at 9 September 2019

A. Distribution of equity securities

Analysis of numbers of equity security holders by size of holding:

			Total Holders
1	-	1,000	487
1,001	-	5,000	581
5,001	-	10,000	195
10,001	-	100,000	186
100,001		Over	28
Total			1,477

There were 71 holders of less than a marketable parcel of ordinary shares.

B. Equity security holders

The names of the twenty largest holders of quoted equity securities are listed as:

Name	Number held	percentage of Units
1 Reesh Pty Ltd	9,046,221	22.77
2 HSBC Custody Nominees (Australia) Limited	4,068,887	10.24
3 Luala Pty Ltd	3,167,332	7.97
4 BNP Paribas Nominees Pty Ltd	2,687,417	6.76
5 J P Morgan Nominees Australia Pty Limited	2,382,633	6.00
6 Accede Pty Ltd	1,272,332	3.20
7 Caddy Fox Pty Ltd	1,154,215	2.90
8 Accbell Nominees Pty Ltd	1,000,000	2.52
9 Citicorp Nominees Pty Limited	917,262	2.31
10 Citicorp Nominees Pty Limited	709,000	1.78
11 Monadelphous Group Limited	603,511	1.52
12 National Nominees Limited	542,000	1.36
13 Mr David James Taylor	463,000	1.17
14 Mr Peter De Leo + Mrs Tiana De Leo	412,300	1.04
15 De Leo Nominees Pty Ltd	407,900	1.03
16 De Leo Nominees Pty Ltd	343,571	0.86
17 Selso Pty Ltd	266,148	0.67
18 CS Fourth Nominees Pty Limited	263,109	0.66
19 Lycopodium Share Plan Pty Ltd	222,500	0.56
20 Botech Pty Ltd	188,959	0.48
TOTAL Top 20 holders of ORDINARY SHARES (Total)	30,118,297	75.80

C. Substantial holders

Substantial holders in the company are set out below:

Name	Number held	percentage of Units
1 Reesh Pty Ltd	9,046,221	22.77
2 HSBC Custody Nominees (Australia) Limited	4,068,887	10.24
3 Luala Pty Ltd	3,167,332	7.97
4 BNP Paribas Nominees Pty Ltd	2,687,417	6.76
6 J P Morgan Nominees Australia Pty Limited	2,382,633	6.00

Directors

Michael (Mick) John Caratti
Peter De Leo
Rodney (Rod) Lloyd Leonard
Bruno Ruggiero
Robert (Bob) Joseph Osmetti
Lawrence (Laurie) William Marshall
Steven (Steve) Chadwick
Peter Dawson

Company Secretary

Justine Campbell

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