

ORELOGYTM
MINE CONSULTING

CAPABILITY STATEMENT

December 2021

THE ORELOGY DIFFERENCE

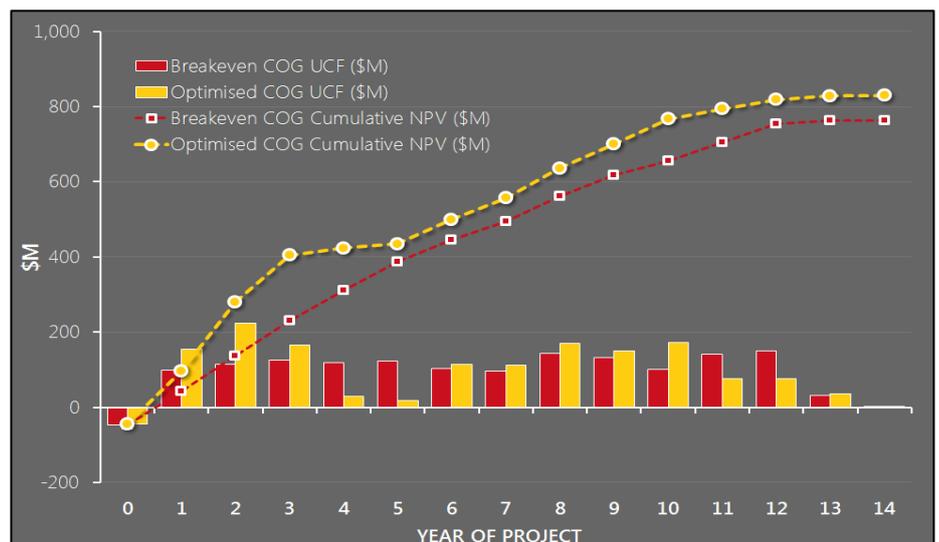
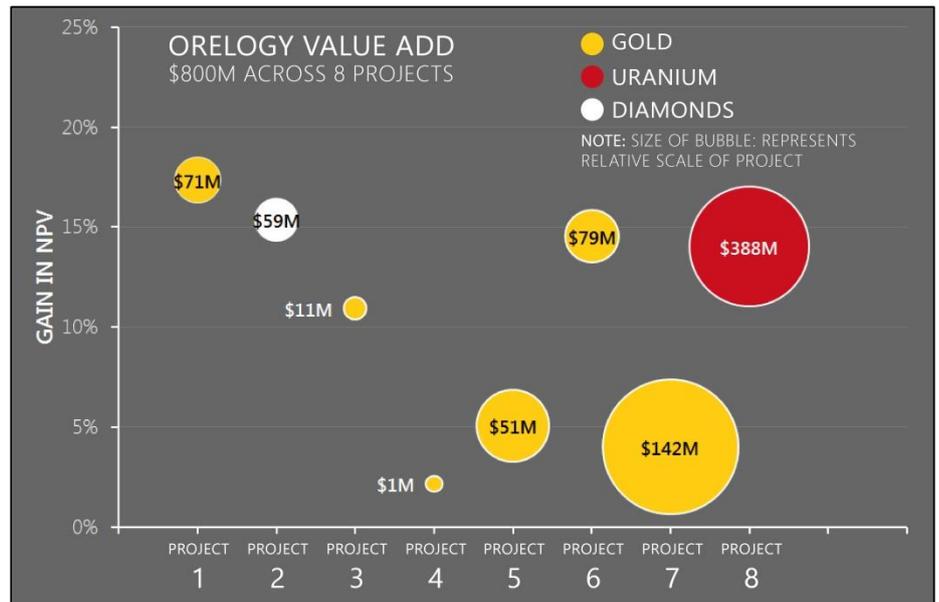
OUR NUMBER ONE GOAL IS TO UNLOCK THE TRUE VALUE OF YOUR PROJECT

Cut-off Grade optimisation is the single biggest value adding task that can be applied to a mining operation. ORELOGY, utilising Maptek's cutting edge and innovative Evolution™ solution, have generated significant added value to client projects in just a few months.

Whether your project is precious metal, base metal or energy commodity based, you will be guaranteed to add value and improve the early cash flow of your operation. ORELOGY ensure that the value is gained within a practical and achievable framework.

Talk to ORELOGY today to unleash YOUR projects full potential by optimising your life-of-mine cut-off grade strategy.

ORELOGY CONSULTING
ADDED \$800M NPV ACROSS 8
PROJECTS



ABOUT ORELOGY

WE ARE A RARE COMBINATION OF BOTH OPERATIONAL EXPERTS AND TECHNOLOGISTS THAT HAVE DEMONSTRABLY IMPROVED THE PROFITABILITY OF MINING PROJECTS FOR OVER 15 YEARS



WHO WE ARE

ORELOGY was established in March 2005 and has organically grown to become a close-knit team of highly experienced professionals and specialist associates.

ORELOGY's clients range from junior explorers through mid-tier developers to a number of the world's largest miners in Australia, Africa and Asia. With many being longstanding clients. ORELOGY's personnel have extensive operational and consulting experience in a range of different commodities throughout the world. As a result, we bring a global understanding of the mining industry to develop practical solutions within a strategic framework.

ORELOGY offers a range of professional services that include Study & Project Management, Open Pit & Underground Mine Design, Scheduling, Technical Reporting, Ore Reserve Estimates, Due Diligence, Cost Modelling, Equipment Assessment and ongoing site support to mining operations.

The continued success of the company can be directly attributed to the professionalism, diligence and innovation of our team of ORELOGISTS.

EXPERIENCE AND EXPERTISE

ORELOGY has a track record consulting in a large range of differing commodities, locations and mining methodologies. As a company and individually we have particular experience and knowledge in the following:

COMMODITIES

- ▶ Gold
- ▶ Nickel
- ▶ Copper
- ▶ Lithium
- ▶ Graphite
- ▶ Uranium
- ▶ Lateritic Ni/Co/Sc
- ▶ Iron Ore
- ▶ Zinc & other base metals
- ▶ Mineral Sands

MINE PLANNING SPECIALITIES INCLUDING:

- ▶ Strategic Mine Optioneering
- ▶ Cut-off Grade Optimisation
- ▶ Open Pit Haulage Minimisation and waste landform optimisation
- ▶ Alternative materials handling such Trolley-Assist IPPC/Railveyor Assessment and Implementation
- ▶ Blend Vectored Modelling and Scheduling
- ▶ Underground mining method selection and access optimisation

OUR CAPABILITY

COMPANY ETHOS

Since 2005 ORELOGY's primary focus has been on providing our clients with value. ORELOGY achieve this by not only utilising smarter technical approaches, but also providing cost effective outcomes in a timely fashion. We call our approach to consulting "AGILE THINKING".

We "think" for our client, utilising our experience, leading-edge technology and common sense to solve problems. Our objective is to always deliver practical, high value outcomes, not just apply cookie-cutter solutions. ORELOGY have a proven track record in applying world class technical solutions to mining projects at both the feasibility and operational phase. Our team of dedicated of mine strategists are fully invested in the projects we undertake and seek to consistently provide the highest value deliverable.

And we are "agile". As a small group we can react quickly and efficiently to our clients' needs and the markets unpredictability, changing approach and deliverables when the goal posts change.



CLIENT SERVICES

ORELOGY's key to successful delivery is that we "think" for our clients, utilising our experience, leading-edge technology and common sense to solve problems and deliver practical, high value outcomes, not just apply cookie-cutter solutions. ORELOGY have a proven track record in applying world class technical solutions to mining projects at both the feasibility and operational phase. Our team of dedicated of mine strategists are fully invested in the projects we undertake and seek to consistently provide the highest value deliverable.

And we are quick on our feet. As a small group we can react quickly and efficiently to our clients' needs and the markets unpredictability, changing approach and deliverables when the goal posts change.

ORELOGY are constantly evaluating the opportunities and risks associated with your

project. Our goal is to meet your key outcomes with the greatest likelihood of success and lowest risk.

ORELOGY provides an extensive range of services to assist clients with the planning and management of their project, and the journey from resource to reserve to operation. These include:

- ▶ Project Management
- ▶ Independent Valuations, Due Diligence Studies and Independent Review
- ▶ Pre-feasibility & Feasibility Studies
- ▶ Scoping Studies
- ▶ NI43-101 & JORC 2012 technical reporting
- ▶ Site Specific Mine Planning Solutions
- ▶ Equipment Assessment, Selection and Costing
- ▶ Operational Implementation & Benchmarking
- ▶ Mine Operations Production, Planning & Support
- ▶ Training

PROJECT MANAGEMENT

ORELOGY undertake management of studies on behalf of clients, ensuring all relevant elements are incorporated, assessed to an acceptable level and completed in a timely fashion.

The management of study programs, particularly feasibility type studies, requires a fundamental understanding of all facets of the proposed mine development.

The development of a project's mine plan must effectively encapsulate all relevant aspects of an entire project, including not just mining but also geotechnical, hydrological, processing, environmental, marketing, tenure, closure, safety and more. This plan will determine the eventual economic viability and overall scale of the project. The requirement for mine planning to interface with all parties to determine project value gives ORELOGY an inherently comprehensive appreciation of all the key parameters of a project and their interaction with each other.

ORELOGY have a core group of highly experienced Principal Consultants and Project Managers who can bring a wealth of experience to any project, across a huge range of locations and commodities.

INDEPENDENT REVIEWS AND DUE DILIGENCE APPRAISALS

ORELOGY is able to provide demonstrably independent analysis and assessments for mining companies, banks and lenders, investors, insurance companies and the like. This form of study includes:

- ▶ Due diligence type assessments of both current operations and planned projects for the purposes of investment, acquisition and divestment.
- ▶ Independent technical audits public reporting
- ▶ Technical reviews for internal company evaluation.
- ▶ Fatal flaw reviews of completed studies.

These appraisals cover a range of issues to varying levels of detail, dependent on time frame, budget and client requirements. They can include:

- ▶ Detailed assessment of the validity and robustness of the parameters used to develop a project (e.g. mining models, optimisation parameters, design parameters, optimise costs). This is particularly important in the case of verifying reported ore reserves conform to the required reporting codes.
- ▶ Examination of planning systems and assumptions to ensure they are practical while at the same time meeting corporate requirements and expectations.
- ▶ Rigorous review of proposed or actual operating systems and management strategies to determine their suitability, effectiveness and whether short or long-term targets are achievable.
- ▶ Assessment of the interface between mining and all other aspects of the project (e.g. geology, processing, environmental) to determine if any of the interacting systems or assumptions adopted are suitable or could be improved.
- ▶ Review the basis for operating and economic projections to determine whether they can be considered valid and realistic.

ORELOGY can produce reports complying with all relevant disclosure requirements and reporting codes and brings a wealth of practical experience, both within Australia and internationally, to the formation of these reports.

SCOPING STUDIES

ORELOGY can undertake all aspects of scoping studies or provide specific mining engineering contributions as part of a larger team.

This style of study involves initial assessment of the practical and economic viability of a project, with a view to confirming whether further, more detailed assessment is warranted.

This involves high-level first pass evaluation using generic or historical parameters to determine potential scale, extent and whether there is a potential break point for applying an underground mining approach. ORELOGY then builds on this by quickly conducting high level strategic scheduling while concurrently assessing the benefits of a cut-off grade and / or blending strategy to fully understand and realise the projects true value. The toolset Oreology uses also allows rapid assessment of different project development options, or "optioneering", which provides our clients with an improved forward view of what their project may realistically look like. In this way, an early indication of the scale of operations and the most appropriate development path can be determined, unlocking the project's true value while also identifying possible risks and opportunities.

The advantage ORELOGY has is our combination of experience and innovative toolsets enables us to turn around these initial assessments in a short time-frame. This agility saves our clients both time and money, and allows rapid decision-making on a sound technical basis.

PRE-FEASIBILITY, FEASIBILITY & IMPLEMENTATION STUDIES

ORELOGY undertake all mining engineering related aspects of pre-feasibility and feasibility assessments. This is usually defined as providing engineering and cost estimates to an accuracy of $\pm 25-30\%$ and $\pm 10-15\%$ respectively. Implementation studies are generally undertaken to budget level accuracy. The projects can be comprised of proposed "green-field" projects, expansions to existing operations, resumption of abandoned developments or combinations of all three. Components covered can include, but not limited to:

- ▶ Mining Method determination and production rate assessments.
- ▶ Optimisation of excavation geometry, be it open pit bench height or underground stope

/ panel, in conjunction with appropriate modifying factors (ore loss, dilution, equipment selection, productivity estimation etc.)

- ▶ Open pit optimisation and / or underground layout optimisation and assessment of any interaction / trade-off between the two.
- ▶ Strategic project development assessment including cut-off grade and / or blending strategies.
- ▶ Detailed, practical open pit and / or underground designs.
- ▶ Calculation of mineable Ore Reserves in compliance with the appropriate reporting standard (JORC, NI-43101, AIM, SAMREC).
- ▶ Life of Mine (LoM) mine scheduling including cut-off grade, stockpiling and blending strategies.
- ▶ Design of mine layouts including mine infrastructure, road networks, surface water management etc.
- ▶ Mine closure and rehabilitation plans.
- ▶ Generation of LoM cash-flows and analysis of key project parameters.
- ▶ Risk and opportunity assessment.

ORELOGY can also cater for the mineral resource estimate, geotechnical appraisal and infrastructure requirements of these studies by utilising our network of recognised and trusted service providers.

ORELOGY have the background and expertise to take mining operations from study level through implementation and execution, with a history of involvement in projects from feasibility through execution to on-going support. We can provide the next level of practical detail to ensure feasibility studies translate into a viable and sustainable operation with the greatest likelihood of success.

EQUIPMENT ASSESSMENT, SELECTION & COST MODELLING

Orelogy has undertaken many studies involving both optimisation of mining methods and assessment of mining equipment selection options.

This includes assessment of:

- ▶ Continuous Surface Miners
- ▶ In-Pit Crushing and Conveying (IPCC)
- ▶ Railveyor Material Handling
- ▶ Trolley-Assist Truck Haulage

It has the knowledge and experience to provide detailed cost estimation and provide recommendations for mining applications and purchases of associated capital items.

TAILORED MINE PLANNING SUPPORT AND MENTORING

ORELOGY personnel collectively have considerable mine planning experience and high-level competency in most recognised mine planning packages, including MineSight, Vulcan, Whittle 4X, Surpac and Datamine. They are regarded as the pre-eminent experts in Maptek Evolution globally.

ORELOGY also has expert scripting and programming skills to help projects where a customised solution is necessary. As a result, ORELOGY can develop comprehensive mine planning systems and procedures tailor-made to the specific requirements of our client. This can vary from strategic life-of-mine planning for multiple working areas to short term planning for individual open pits.

ORELOGY can provide a bespoke planning support service to operations at either the implementation, pre-production or production phases of operation. This includes every level from Life of Mine (LoM) schedules, annual

budgets to monthly production schedules, including development plans and blast layouts.

ORELOGY personnel have considerable practical site experience and this background can be of considerable benefit to clients. ORELOGY personnel have often been embedded with our client's team to offer on-going mine planning expertise, training and mentoring to site based personnel. Their role can include review and optimisation of all aspects of site mining operations, from the mine face right through the mine operations and planning chain to the end customer.

ORELOGY are also agile enough to quickly react to a client's requirements and provide support as and when needed.

SCHEDULING EXPERTS

As mine planning engineers, our primary goal is to improve the value of a mining project. This goal is best served through development of robust and practical high value mine plans using smart scheduling techniques.

ORELOGY has always sought ways to deliver improved solutions to our clients, and as part of that process ORELOGY developed EVOLUTION, a best-of-breed open-pit mine scheduling solution that harnesses a variety of optimisation techniques.

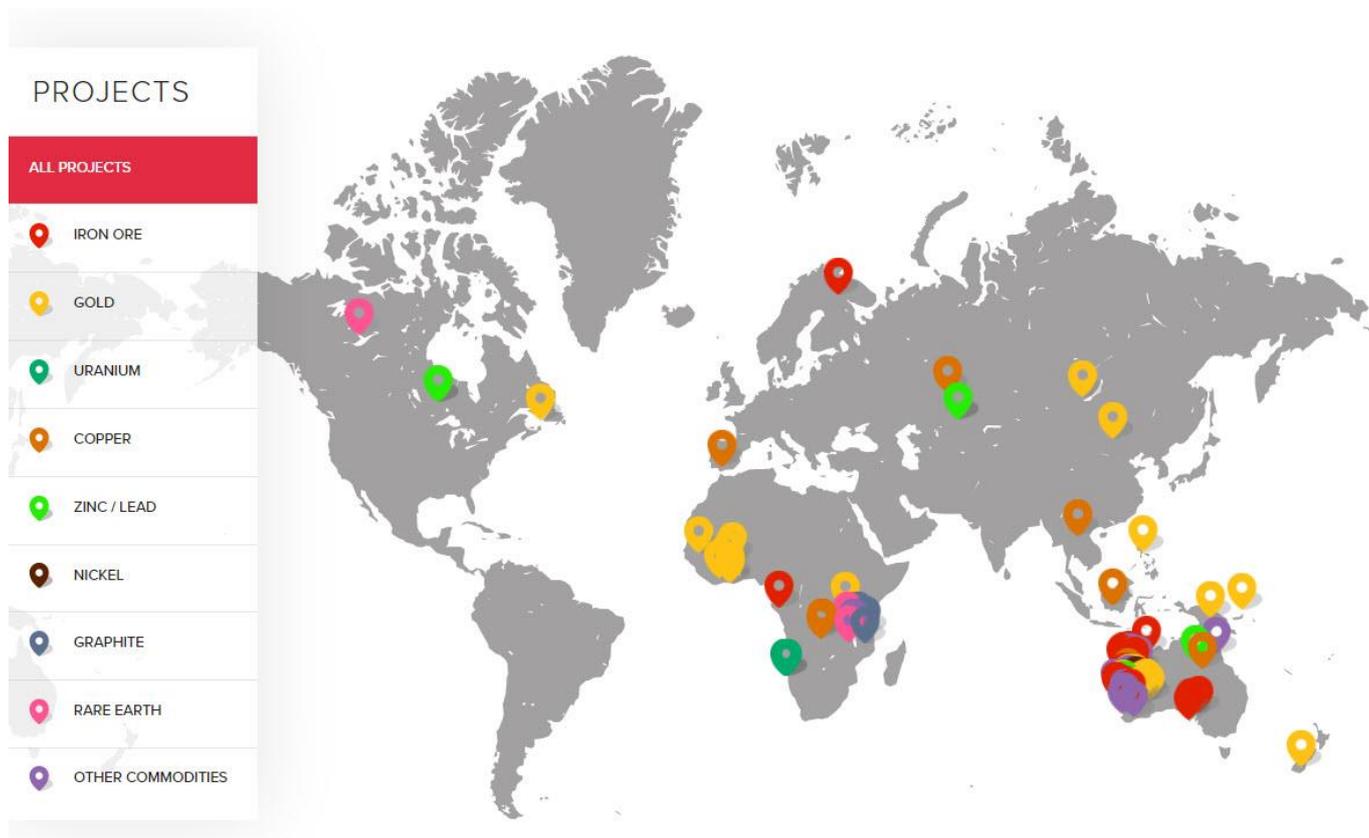
In October 2014 Maptek™, providers of the Vulcan general mining software, acquired the EVOLUTION suite of products from ORELOGY. Its acquisition by Maptek is a validation of the unique and proven product ORELOGY developed.

ORELOGY remain the pre-eminent power users of the EVOLUTION product globally and bring an unrivalled capability in the application of this product to provide real world mining solutions.

ORELOGY personnel have often been “embedded” with clients to offer ongoing mine planning expertise, training and mentoring to site based personnel. Their role can include review and optimisation of all aspects of site mining operations, from the mine face right through the mine operations and planning chain to the “end client”.

ORELOGY pride ourselves on our ability to quickly respond to a client’s requirements and provide support as and when required.

PROJECTS BY LOCATION & COMMODITY



THE ORELOGISTS

STEVE CRAIG

MANAGING DIRECTOR

BEng(Mining- Hons), FAusIMM

Steve has been professionally employed in the mining industry since 1988 in a variety of operational, management and mine planning roles. Since January 1995, he worked as an independent consultant specialising in mine planning, software implementation and training. This has afforded Steve an extensive range of experience in both mining location (Australia, UK, USA, Europe, South America, Africa, South East Asia and the CIS) and commodity (gold and PGM's, base metals, iron ore, industrial minerals and diamonds).

In early 2005, Steve co-founded a new consulting practice in Perth, Australia called ORELOGY, with the key objective of supplying specialised mine planning services to the mining industry worldwide. During this period Steve was pivotal in both growing the ORELOGY's consulting business and also the in-house development of the EVOLUTION mine scheduling solution. When the software and IP was acquired by Maptek in 2014, Steve was seconded to Maptek for 3 years as the person responsible for the continued development of Evolution under the Maptek banner.

In November 2017 he returned to ORELOGY and once again assumed the position of Managing Director. He brings a wealth of new experience back to this fundamental role and is ideally placed to guide ORELOGY forward into the future.

ROSS CHEYNE

DIRECTOR / GENERAL MANAGER OPEN PIT

BEng (Mining- Hons), FAusIMM

Ross has been employed professionally since 1990. And has extensive operational and planning experience. This includes working in Australia, Ghana, Malaysia, Myanmar and Ireland. He began his consulting career in 2001 with CSA in Dublin, then with Snowden Consultants in Perth before co-founding ORELOGY with Steve Craig in 2005.

As a Director and Principal Consultant with ORELOGY, Ross has managed work on numerous projects in a range of commodities, scales and locations across the globe. He has undertaken all aspects of the mine planning cycle with an emphasis on costing and financial modelling. Ross has always been primarily focused on the consulting aspects of the ORELOGY business. So when Steve Craig was seconded to Maptek in 2014 as part of the Evolution software acquisition, it was a natural decision that Ross would remain at ORELOGY and take the reins as MD. He managed ORELOGY through 2014 to late 2017, successfully keeping the team of Orelogists together through a difficult period in the mining industry. When in late 2017 Steve returned to ORELOGY after completing his tenure with Maptek and resumed his role as MD, with Ross supporting him as Technical Director. This "dynamic duo", along with a stable core team of Orelogists, had been extremely successful in the past, and was now well positioned to continue this success moving into the future.

ANDREW COOPER

PRINCIPAL CONSULTANT

BEng (Mining), WASMA, MAusIMM

With two decades of experience working with mine owners, contract miners, and as a consultant, Andrew is results orientated in delivering technical process improvements, risk management, life of mine planning, feasibility studies, operational management, production ramp-ups, and productivity improvement.

Andrew is now focused on implementing best practice long-term and life-of-mine planning, risk management, equipment selection, cost estimation, business planning and operational transformation.

JAKE FITZSIMONS

PRINCIPAL CONSULTANT

BEng (Geological Eng), FAusIMM

Jake commenced work in the mining industry in 1986 and has a depth of experience in site-based operations. His experience included 10 years at Cawse Nickel Laterite Operations rising to the level of Mining Manager.

Jake moved to a technical role in 2008 and joined a mid-tier company as Study Manager working on a large world class magnetite project before joining ORELOGY in 2012.

As GM Consulting, in addition to managing the consulting team and engaging with clients, Jake has worked on a wide range of projects and commodities as project manager.

RYAN LOCKE

PRINCIPAL CONSULTANT

DipEng, MAusIMM

Ryan has worked in the mining industry since 1999, predominantly in nickel & gold operations, in both OC & UG.

Since commencing with ORELOGY in 2009, Ryan has undertaken the lead technical role for numerous commodities both inside and outside Australia, including cost estimates, mine design, mining schedules, project evaluations, dilution & recovery analysis from scoping studies through to BFS.

Ryan is considered one of the pre-eminent users of Maptek's Evolution software worldwide.

CAREL MOORMANN

PRINCIPAL CONSULTANT

MSc (Mining), FAusIMM

Carel has been employed as a professional mining engineer since 1982 in variety of underground and open pit mines, with extensive experience in operational, management & planning roles. In 2005, Carel started work in the mine planning environment with BHP Billiton.

Carel joined ORELOGY in October 2007 and has worked as project manager on numerous projects.

ALEKS MIHAILOVIC

SENIOR MINING CONSULTANT

BSc (Mining-Hons), MAusIMM

Aleks started in the mining industry in 1994 and has experience working worldwide, including 8 years in technical and managerial roles in large open pit mining operations in Africa. He has significant exposure to coal, copper, gold, bauxite, mineral sands, rare earths.

His experience includes open pit mine planning and production management systems, feasibility studies, open pit cost evaluations, project expansion studies, project optimisation studies, equipment selection and Mine-to-Mill Optimisation. His specialist expertise includes mine planning with continuous mining systems. Aleks joined ORELOGY in 2013.

BUFFY DAVIES

SENIOR MINING CONSULTANT

BEng(Mining)

Buffy joined Orelogy in September 2019 as an experienced underground planning engineer. Over her 20 year career, Buffy has a diverse background gained from working with Macmahon, Goldfields, Golden Grove and Kimberly Nickel Mines and others in a variety of roles from Management through to technical including Alternate Mining Manager, planning engineer and underground tendering.

HOSSEIN PARHOON

SENIOR MINING CONSULTANT

MEng(Mining) MAusIMM

Hossein has worked in the mining industry since 2008. Whilst working for consulting companies in Iran he gained valuable site and head office experience in various aspects of the mining industry. Since coming to Australia, he has continued professional growth by working on a variety of different projects.

Hossein joined ORELOGY in 2011, and since this time has broadened his knowledge and experience with project work completed including pit optimisation, pit design and LOM scheduling.

JUN LIANG

SENIOR MINING CONSULTANT

BEng (Mining)

Jun joined Orelogy in Dec 2018 and brings her knowledge of Underground and Open Pit Mining gained from working in operations such as Nifty and Homestead/Bullant Underground mine and Enterprise open pit.

Jun has considerable underground planning experience delivering life of mine planning, feasibility studies, and detailed mine design across a range of mining methods. More recently Jun was promoted to Senior Mining Consultant.

ETHAN O'BRIEN

SENIOR MINING CONSULTANT

*Grad Dip. Mining
B. Sc Mine & Engineering*

Ethan is a professional mining engineer currently based in Oregon USA and as such, Ethan provides support to both our North American and Australian clients.

Ethan graduated as a mining engineer in 2005 and has worked across multiple operations in Western Australia in a variety of roles before emigrating to the US in 2016.

Ethan commenced working with Orelogy in 2019 and provides a range of planning services including pit optimisation, mine design and site support.

DAVID EATON

MINING CONSULTANT

MMinEng, AAusIMM

David's site experience includes 5 years at Tropicana Gold Mine as a mine planning engineer, drill and blast engineer, and registered alternate quarry manager. Prior to this, David has worked in an engineering consultancy with experience in major underground infrastructure projects and mine site services.

LAWRENCE VINCENT

SENIOR MINING CONSULTANT

*BEng (Hons)/BCom, Dip. Mod. Lang. (French),
MAusIMM*

Lawrence has worked in both OP & UG hard rock mining operations in Western Australia. Graduating in 2011, he gained experience in Drill & Blast and Geomechanical Engineering. Lawrence joined ORELOGY in 2015 and has been developing his understanding and skills at the more strategic horizon of mine planning. He has worked on pit optimisation, pit design, life-of-mine strategic and detailed scheduling, cost modelling, and geotechnical studies across commodities such as gold, nickel, copper, iron ore, uranium, graphite, and lithium.

BRENDAN HART

MINING CONSULTANT

BEng(Mining) MAusIMM

Brendan completed his undergraduate study at the Western Australian School of Mines. During this time Brendan worked in several vacation placements including Maggie Hays Nickel Mine, Frog's Leg Gold Mine and Phosphate Hill Mine.

After graduating with honours, Brendan completed a Graduate Program with Gold Fields at Agnew Gold Mine.

Prior to joining Orelogy, Brendan has held consulting positions with Rock Team, Mining Plus, and Mine Geotech. Brendan has recently commenced work at Orelogy in 2019 as a mining consultant focusing on mine planning and design.

DAMIEN STEINBACHER

MINING CONSULTANT

Grad Dip. Mining

B. Sc Mine & Engineering Surveying

Damien is a professional mining consultant with over 13 years' experience in the mining industry across a variety of technical disciplines, including geology, surveying and engineering. Prior to joining Orelogy, Damien worked as a contractor and consultant for 10 years, gaining practical knowledge of mining operations and systems at dozens of minesites across Australia.

Most recently, Damien has been consulting as a mining engineer and planner, focusing on short-to medium-term mine planning and design.

MIKE HOBBS

MINING CONSULTANT

Adv.Dip Eng Mining & Surveying AusIMS

Mike has worked in the mining industry for over 17 years as a surveyor and more recently production engineering. Mike's experience includes predominantly underground and open pit mining as well as civil construction. Mike has worked with multiple mining methods from narrow vein to caving and has been involved in multiple start-up operations.

Mike has recently joined Orelogy as a Mining Consultant focusing on mine planning for underground metalliferous operations.

ALINE COSTA

MINING CONSULTANT

BEng (Mining)

Aline commenced her career in Brazil after completing her mining engineering degree in 2017. After spending some time with Samarco Mineração, Aline commenced working with Datamine in Johannesburg during 2017 with a focus on underground mining applications and supporting clients across a range of commodities and mining methods. Aline commenced work at Orelogy in March 2021.

NATASHA MASCURINE

OFFICE MANAGER

BBus (Marketing & Tourism)

Natasha has over 15 years of experience in the Mining and Oil & Gas Industry. Natasha brings a range of skills from running the day to day office along with extensive knowledge of document control and management, tender coordination and compilation whilst providing consistency and delivery of high quality submissions. Natasha has a strong background in Business Improvement and continually applies this to her role here at ORELOGY.



SNAPSHOT OF RELEVANT PROJECTS

COMPANY	PROJECT	COUNTRY	COMMODITY – WORK
Polyus Gold International	Sukhoi Log	Russia	Au – Owners Engineer
Red 5	King of the Hill	Australia	Au - Implementation Plan
Matador Mining	Cape Ray Gold	Canada	Au – Scoping Study
Liontown Resources	Kathleen Valley	Australia	Li – PFS open pit and underground mining study
Dacian Gold	Mt Morgans	Australia	Au – LOMP Update & Ore Reserves
Endeavour Mining	Sabdiola	Africa	Au – DFS
Primary Gold	Rustlers Roost	Australia	Au – PFS Update
Superior Lake Resources	Superior Lake	Canada	Zn – DFS
Hanking Australia	Toms Gully	Australia	Au – UG PFS
Firefinch Ltd	Morilla Restart	Africa	Au – Restart Project and Ore Reserve Statement
Superior Gold	Plutonic	Australia	Au – NI-43 101 underground development; Mine Planning support
Gold Road Resources	Yamarna/Gruyere	Australia	Au – Strategic Planning/DFS including caving studies
Allied Gold	Bonikro	Cote d'Ivoire	Au – Strategic Planning/DFS/Implementation Studies including mine re-start
	Sadiola	Mali	Au – Strategic Planning/DFS/Implementation Studies including mine re-start
	Ashashire	Ethiopia	Au – PFS & Ore Reserve Statement
29 Metals	Golden Grove	Australia	Cu/Zn – Underground LOM studies, ongoing support
Ibaera Capital	Gold	Ghana	Au – Wa Gold DFS, Tender package and implementation studies
Cheetah Resources	Rare Earths	Canada	REE - Nechalacho PFS
Kamoto Copper Co	Katanga	DRC	Cu/Co - LOM Planning Review
Alita/AMAL/Tawana	Bald Hill	Australia	Li – UG Mining Contract Tender & PFS
Talisman Mining Limited	Sinclair	Australia	Ni – Resource Estimation Support
Undisclosed	Various	Various	Confidential due diligence – underground Cu/Au projects
Sandfire Resources	T3/A4	Africa	Cu – DFS/LOMP
First Quantum Minerals	Various	Various	Cu – Corporate Planning Support
Nzuri Copper	Kalongwe	DRC	Cu – PFS / DFS
St George Mining Limited	Project Destiny	Australia	Ni – Mining Study/LOM Strategic Plan
RTG Mining	Mabilo	Philippines	Cu/Au/Fe – Scoping / PFS
RMG	Kamarga project	Australia	Zn/Pb - Mine planning study
BBI	Multiple Projects	Australia	Iron Ore/Various – PFS/LOMP/DD
Atalaya Mining	Rio Tinto Copper Mine	Spain	Cu – Mine planning Review
Barrick	Lumwana Copper	Zambia	Cu - SS/PFS/FS continued mine planning support from inception to 2019
RMG	Tuina Copper Project	Chile	Cu – Mine planning study
Mod Resources	Mahumo Cu project	Botswana	Cu – Mine planning study
Confidential	Pebble Copper project	US	Cu – Mine planning study/DD
Swakop Uranium	Husab Project	Namibia	U – SS/PFS/DFS operational planning (involved over the past 10 years)

PROJECTS BY METHOD & COMMODITY

		Primary Commodity																										
		Coal	Bauxite	Iron Ore	Manganese	Garnet	Mineral Sands	Limestone	Kaolin	Poly Metallic	Copper	Zinc	Lead	Tin	Nickel Laterite	Sulphide Nickel	Graphite	Vanadium	Molybdenum	Niobium	Lithium	Tungsten	Uranium	REE	Gold	PGE	Diamond	Other
Surface Mining	Strip Mining	✓					✓																✓					✓
	Quarrying		✓			✓	✓	✓																				
	Open Pit (Large/Bulk)			✓	✓				✓	✓	✓				✓	✓	✓	✓		✓	✓		✓	✓	✓		✓	
	Open Pit (Selective)			✓	✓		✓		✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Mineral Sands					✓	✓																					
	IPCC			✓																								
	Surface Miners		✓	✓																				✓				
Underground Mining	Block Caving									✓																✓		
	Sub-level Caving														✓													
	Stoping with fill									✓	✓	✓			✓										✓			
	Open Stoping								✓						✓						✓							
	Cut and Fill Stoping									✓	✓				✓										✓			
	Room & Pillar									✓	✓	✓									✓				✓	✓		
	Narrow Vein Stoping									✓	✓														✓		✓	
	Airleg Stoping													✓		✓									✓			✓
	Civil Tunnelling																											✓

ATOMORPHIS

WHO IS ATOMORPHIS?

Atomorphis was established in 2018 by Steve Craig and Christie Myburgh with the objective of building bespoke solutions for our clients. Our ethos of “we build it, you own it” has resonated with the industry and allowed Atomorphis to build and solve some very interesting and unusual problems. We are always looking to the future and are employing bleeding edge techniques to help solve these challenging problems. These include:

- ▶ Various Orelogy clients on a variety of problems including:
 - Triple sequential float modelling engine
 - Optimised underground extraction sequencer
 - ROM bin simulation modelling
 - Satellite haulage simulation modelling and integration
- ▶ Building a value calculation engine for Blast Movement Technology.
- ▶ Undertaking multiple assignments with Maptek including Evolution enhancements and machine learning techniques for resource estimation.
- ▶ Building and solving a rostering problem for a leading airline.
- ▶ Building an agent-based model to simulate a very large iron ore autonomous haulage system.
- ▶ Build a programmatical solution for a tendering platform for a leading WA based mining contractor.

Atomorphis are now embarking on building a new product called gemini, which will effectively simulate the daily shift and mine plan for an operation. This web-based prototype is currently in development and is being led by Nathan Middleton and supported by Christie Myburgh and Steven Bi.

Together Orelogy and Atomorphis can provide a unique set of skills and knowledge to solve a diverse range of problems.

More information can be found at www.atomorphis.com.

CONTACT US

P: +61 (0)8 9318 5333

E: info@orelogy.com

W: www.orelogy.com

UNIT 19, BLUENOTE BUILDING, 162 COLIN STREET WEST PERTH WA 6005

PO BOX 1379, WEST PERTH BC 6872

ABN 18 121 235 327

