

# Our Capabilities



**XTRACT MINING CONSULTANTS** is a privately owned and operated mining and resource industry consultancy providing independent, strategic and tactical advice and personalised professional services to exploration and mining companies, engineering firms, financial institutions and investors.

This is a summary of the capabilities of our teams. A complete overview of the individual consultants who make up our teams is available in the “Our People” leaflet.

## Our Capabilities



- Investor support-competent persons report, due diligence and evaluations
- Divestment, Mergers and Acquisitions and strategic advice
- Reviews and audits
- Project risk assessment
- Advice on sampling, data management grade control and reconciliation
- Mineral Resource and Ore Reserve estimation
- Geostatistical applications
- Resource and mining Pre-Feasibility Study and Final Feasibility Study reports
- Mining engineering, planning, mine optimisation and improvement
- Environmental baseline, due diligence, feasibility, impact studies, approvals and operational management
- Regulatory reporting (JORC, NI43-101, SAMREC, SEC, Sarbanes-Oxley, etc.)
- Expert witness representation
- Training and mentoring



[XtractGroup.com](http://XtractGroup.com)

Xtract - Excellence from the outset

## Our Commodities

Our consultants have experience in a range of commodities and geographic areas including gold, coal, bauxite, copper, base metals, iron ore, nickel sulphide and nickel laterite, diamonds, platinum group elements, mineral sands and uranium.

## Our People

Our principals are recognised, trusted and experienced industry professionals who are fully committed to providing responsive, effective and optimal solutions and services to our new and regular loyal clients. We are passionate about what we do, thoroughly enjoy our work and sharing our knowledge, and through our team approach encourage regular and open communication. All this leads to an exceptional work environment and great outcomes for our clients. Comprehensive information about each of our consultants can be found in the “Our People” leaflet.

## Our Network

Our extensive network of Associates provides us with an additional depth of experience and range of specialist skills that complement our own and provide us and our clients with access to these resources across Australia and abroad, including South Africa, United Kingdom, Mongolia, Canada and Chile.

## Our Services

Being privately owned, Xstract Mining Consultants are able to provide independent, strategic and tactical advice, as well as personalised professional services to exploration and mining companies, engineering firms, financial institutions and investors.

Our consultants have experience in a range of technical areas, commodities and geographic areas including gold, coal, bauxite, copper, base metals, iron ore, nickel sulphide and nickel laterite, diamonds, platinum group elements, mineral sands and uranium.

Furthermore, our associate’s network provides an additional range of experience and specialist skills that provide us and our clients with access to these resources across Australia, Africa, Europe, Mongolia, and North and South America.

Our areas of specialisation:

### Geology and Mineral Resource Evaluation

Xstract's geology team has a wealth of global experience working in remote and culturally diverse environments. We are specialists in underground and open pit mining, seam and narrow vein modelling, bulk mining, grade control and short to long term strategies in a range of commodities including Coal, Bauxite, Base Metals, Precious Metals, Industrial Minerals and even the unusual. We have capabilities in a variety of mining packages including Datamine, Surpac, Vulcan, Supervisor and others. Our geology team's key consulting areas include:

- Technical studies from scoping through to feasibility
- Exploration targeting and management
- Technical reviews, due diligence and audits
- Compliance reporting of resources (e.g. JORC Code, NI 43-101, etc)
- Resource modelling and evaluation
- Sampling theory & practices
- Data QAQC
- Resource, grade control and mine reconciliation
- Geostatistical applications from variography through to conditional simulation and recoverable resource estimates
- Training and mentoring in all the above and more...

## Mining and Ore Reserve Evaluation

Xstract's team of mine engineering consultants have capabilities in open cut and underground coal, precious metals and base metals mining. We have worldwide experience with conceptual, prefeasibility and feasibility studies, short and long term coal mine planning and scheduling, underground thin vein mining and hard rock mining using software such as XPAC, Vulcan, Surpac, Datamine and Whittle. We have worked with projects ranging from very small operations through to multinational operations across numerous countries and commodities including Coal, Precious Metals, Base Metals, and Industrial Minerals. Our mining engineering team offers expertise in the following areas:

- Scoping, prefeasibility, feasibility study input and management
- Strategic development
- Reserve estimation
- Financial and technical evaluation
- Due diligence and audits
- Project assessment
- Mine planning and scheduling
- Equipment selection
- Mine optimisation and operational optimisation
- Contract management and more...

## Corporate Services (including Valuation and Risk)

Xstract's corporate services team includes mining engineers, geologists and mining analysts with vast experience in financial modelling, strategic advice, technical reporting and due diligence. We provide highly relevant corporate advice and optimal solutions through our knowledge of multiple commodities, advanced valuation techniques and the idiosyncrasies of the mining industry and its key drivers, with capabilities in @Risk, Crystal Ball, resource modelling or mine engineering software. We are linked through long-standing networks in the minerals industry as well as the financial/investment and legal communities.

Our key consulting areas include:

- Technical and compliance reporting (JORC Code, NI 43-101, SAMREC, SOX, IPOs, Information Memoranda, Independent Expert Reports, etc)
- Due diligence
- Strategic advice delivery to the mining industry, financial and legal institutions and government agencies
- Cost modelling and estimation
- Financial evaluation of mining and exploration projects using standard techniques as well as more advanced methods such as Real Options Valuation
- Valuing strategic decision pathways and determining their financial viability and feasibility
- Manage existing or developing new strategic decision pathways for assessing future opportunities.
- Qualitative and/or quantitative risk analysis of mining and mineral projects
- coaching and mentoring
- Expert witness representation and more...

## Technologies

Xstract's technologies team has a strong knowledge of hardware and software based solutions associated with exploration, geology and mining processes. Our approach to providing technology is through Microsoft based systems and products while integrating “off the shelf solutions” to suit your business processes. We can deliver technical solutions to database implementation and management, remote digital data collection systems, and developing databases that make your life easier.

## Processing

Xstract's associate mineral processing team provides experience across the mineral chain from beneficiation to extraction and transformation for Mineral Sands, Iron, Copper, Nickel, Lead, Tin, Zinc, Tungsten, and Gold extraction. They have consulting specialisations in mineral beneficiation, hydro and pyro-metallurgical treatment, flow-sheet design, optimisation and development of processes, the analysis, development and management of projects along with commissioning process plants in complex and foreign environments. We are planning to complement this associate team with in-house consultants very shortly.

## Environment

Xstract's environment team aims for sustainable outcomes for the Mining Industry. We appreciate the fluctuating balance between environmental constraints, operational practicalities, social contexts and regulatory licensing demands. We can advise how impacts can be mitigated to facilitate the broad-based acceptance of your project. We have prior experience both within Australia's jurisdictions and, in many cases, internationally.

Xstract's environmental services are applicable throughout the project lifecycle of every mining project. In developmental phases, our services include:

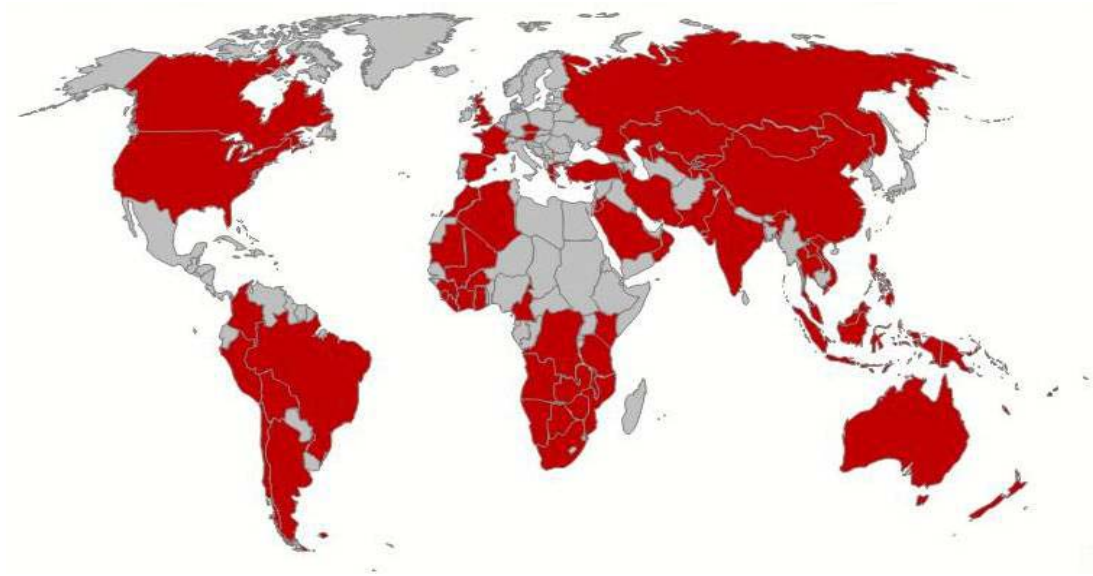
- Due diligence
- Co-ordination of baseline studies
- Scoping studies and feasibility assessments
- Impact assessment ("EIA") and environmental management plans ("EMP")
- Approvals, licenses and bonds

At operating sites we assist with:

- Environmental management systems
- Inductions and operational procedures
- Third-party audits, action plans and liability assessments
- Annual reporting and closure planning

Xstract's associate team of environmental scientists have expertise in surface and ground water, air quality, greenhouse gas emissions, waste management and site remediation.

## Xstract Collective Team Experience:



## Commodity Knowledge:

- Barite
- Bauxite
- Beryllium
- Chrome
- Coal
- Coal Seam Gas
- Cobalt
- Copper
- Diamonds
- Dimension Stone
- Evaporates
- Glass Raw Materials & Silica
- Gold
- Industrial Minerals-Clay Minerals
- Iron Ore
- Lead
- Limestone
- Magnesite
- Manganese
- Mineral Sands
- Nickel
- Oil Shale
- Petroleum & Natural Gas
- Phosphate
- Platinum Group Metals
- Potash Feldspar
- Rare Earths
- Silver
- Sn-W-Ta-Nb Group
- Talc
- Tin
- Uranium
- Vanadium
- Wollastonite
- Zeolite
- Zinc

## Our Team Overview

### Geology & Technologies Focus

- Mark Noppe (MD, Principal Consultant), MSc, MAusIMM, CP(Geo)
- Stefan Mujdrica (GM, Principal Consultant), MSc, MCSE, CP(Geo)
- Mark Murphy (GM Perth, Principal Consultant), BAppSc (Geol), MSc (Mathematics), MAIG, RPGeo
- Dr Isobel Clark (Principal Consultant – Perth), BSc MSc DIC PhD FSS FIMMM FSAIMM CEng QP
- Ian De Klerk (Principal Consultant), MSc (Exp.Geol.), Grad.Dip.Eng (Mining), MAusIMM
- Matthew Readford (Principal Consultant), BScGeol (Hons), MBA, MAusIMM
- Patrick Rice (Principal Consultant), MEng, Grad Dip Eng (Geostatistics/Geology), FAusIMM
- Shaun Hackett (Principal Consultant-Perth), BAppSc (Geology), MAIG, MAusIMM
- Trevor Ellice (Senior Consultant), BSc (Hons), MAusIMM
- Andrew Grieve (Senior Consultant) BAppSc (Geol)
- Stephanie Gotley (Senior Consultant-Perth), BSc (Hons), MAusIMM
- John Everard (Senior Consultant-Perth), BAppSc, (Geol), MBA, MAusIMM
- Craig Williams (Senior Consultant), MSc (Geology), Graduate Diploma of MEng
- James Carpenter (Senior Consultant), BAppSc (Hons), MAusIMM
- Celeste Grobler (Consultant), B.Sc Hons (Geology), MAusIMM
- Nick Anderson (Consultant, Technology –Brisbane), BSc (Hons), M.Sc. (Earth Science)
- Emma Harding (Senior Geologist) B.Sc. (Geology),MAusIMM
- David Green (Associate-Coal Geologist), BSc (Hons), MAusIMM, MGSA
- Peter Swiridiuk (Associate-Exploration & Geophysics), BSc (Hons), DipEd, MAIG
- Alan Bayrak (Associate-Geology-CSG and Basin Analysis), BSc, MSc, PhD
- Ricardo Valls (Associate-Geology & Exploration, Toronto), BSc, MSc, MCIM, MGAC, MAPGO
- Andrew Bowden (Associate-Exploration & Geology), MSc, FGSC, CP (Uranium Geology)
- Elisabeth Haren (Associate – Training & Geology), BSc, MAusIMM, CPGeo

### Corporate Services Focus

- Jeames McKibben (GM, Principal Consultant), BSc (Hons), MBA, MAusIMM, MAIG
- Manish Garg (Manager & Principal Consultant- Evaluations), BEng (Hons) (Met.Eng), MAppFin, SA Fin
- Jonathan Bell (Principal Consultant-Perth), BSc (App Geol.), M.Sc. (Mineral economics), MAIG,GAICD
- Francois Grobler (Principal Consultant-Perth), MSc Eng (Min Econ), Dipl (Fin Mngmt), MSAIMM, MAusIMM, Pr. Sci. Nat
- Colin Hannah (Principal Consultant, Plant and Machinery), FAPI (P&M)
- Shaun Barry (Senior Consultant), BSc (Hons) (Geology), MSc (Engineering-Mineral Economics), Dipl. Investment Management, MAusIMM
- Antonio Egana (Senior Consultant), MSc (QMinEx), GDipCom, MAusIMM
- Michael Tyndall (Senior Consultant), BSc (Hons), Grad Dip (MinEng), MAusIMM
- Christopher Stephens (Associate – Corporate Services), BSc (Hons), PhD, MAIG, MAusIMM
- Stephen Redford (Associate-Mining & Corporate Services), MSc
- Luis Martínez (Associate - Real Options), BSc (Mining), MSc, MAusIMM, MSME

### Mining Focus

- Kevin Irving (GM, Principal Consultant), BSc (Hons) MBA, CEng, FAusIMM, FIMMM
- Gary Methven (Principal Consultant), BSc, MAusIMM, Registered Professional Eng.Qld
- Tim Horsley (Principal Consultant), BSc Mining (Hons), MAusIMM, Chartered Eng (UK)
- Donald Elder (Principal Consultant), Grad Dip Eng (Mining), MAusIMM
- Xavier Hill (Senior Consultant – Perth), MBA, BEng (Mining), MAusIMM
- Chris Faast (Consultant), B.Eng (Hons), MAusIMM
- Charlotte Nangolo (Consultant – Perth) BSc (Mining Eng), MSc Eng (Mineral Economics)
- Rajesh Singh (Mining Engineer), E.Eng (Mining)
- Andrew Ross (Junior Technical Draftsman)
- Bradley Offer (Junior Technical Draftsman)

- Eduardo Valenzuela (Associate-Mining Engineering), BE(Hons), MB, FAusIMM
- Phil Morriss (Associate-Mining Engineering), BSc (Hons) Civil Eng, MAusIMM

### **Environmental Focus**

- Roger Dawson (Principal Consultant), BSc (Hon)(Botany), PhD (Environmental Science), EIANZ

### **Processing Focus**

- Tom Owen (Associate-Processing), BSc (Hon) (Metallurgy), MAusIMM, Chartered Engineer (UK)

### **Other Associate Consultants**

We can draw on a network of some 22 mining engineers, geotechnical engineers, blasting specialists, exploration geologists, resource specialists, coal geologists, metallurgists, environmental engineers, financial analysts, and business improvement specialists based across Australia, Canada, Chile, Mongolia, South Africa and UK.

### **Support Team**

- Tanya Bartram (General Manager-Commercial & Finance - Perth), BBus (Acc.), CPA
- Silke Stolze (HR and Marketing Advisor) APRCSA
- Priscilla Ombrasine (Accounts Clerk - Perth)
- Natalie Gardner (Technical Editor), BA
- Bradley Royine (Project Administrator)
- Rebecca Summerville (Administrator)
- Val Dekenah (Perth Office Administrator - Perth)



## Our People

**XSTRACT MINING CONSULTANTS** is a privately owned and operated mining and resource industry consultancy providing independent, strategic and tactical advice and personalised professional services to exploration and mining companies, engineering firms, financial institutions and investors. This is a listing of the experience and capabilities of our individual consultants. A complete overview of the services and capabilities of our teams is available in the “Our Capabilities” leaflet.

We are a team of genuine leaders providing unrivalled levels of insight, knowledge and solution delivery to the mining and resources industries. Committed to giving clients the highest level of engagement, we are confident that our wide range of expertise and our wealth of experience will not only result in the best technical outcomes for our clients, but will also provide them with a distinctive consulting experience. Please read on to meet the mine consulting team.



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## Experience and Qualifications of Our Consultants

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### Geology & Technologies

#### Mark Noppe / Managing Director and Principal Consultant



Since first graduating as a geologist in 1983, Mark worked in South Africa for Anglo American Corporation (1984-1997), and in Western Australia and Queensland for Snowden Mining Industry Consultants (1997-2008) and Mining Associates (2008-2009) in exploration, mining geology, practical geostatistics applications, resource estimation, grade control, mine reconciliation and professional training and mentoring. Mark has been in consulting since 1995 and his technical experience covers a wide range of commodities, geological and mining settings, including coal, gold, nickel laterite and sulphide, alluvial, eluvial and hard rock diamonds, base metals and industrial minerals.

He has previously held positions as Chairman of the Southern Queensland branch of the Australasian Institute of Mining and Metallurgy (“AusIMM”), and the Geostatistical Association of Australasia. Mark has a BSc (Geology; Chemistry), MSc (Exploration Geology), post-graduate Diploma (Terrain Evaluation), is a Member and CP (Geo) of the AusIMM.

#### Stefan Mujdrica / General Manager and Principal Consultant



Stefan has over 20 years of mining industry experience, and his career has spanned from exploration to mining geology positions in a number of managerial roles and locations. His previous role as General Manager and Principal Consultant Geologist of the Brisbane office for Snowden (2001-2008) involved managing a team of 30 consultants and administrative personnel within various disciplines. Geological expertise includes technical reviews, due diligence, sampling and reconciliation, short-term grade control strategies, resource estimation, database/computer management, feasibility studies, geostatistics, risk assessment through conditional simulation, mentoring and training.

Stefan's experience covers a range of commodities in a variety of geographic locations and geological settings, including bauxite, gold, copper, cobalt, zinc, lead, silver, PGEs, potash, kaolin, coal and iron ore. Stefan has worked globally including countries such as Ghana, CIS, Eastern Russia, Thailand, Indonesia, Brazil, Peru, Chile, Argentina, Papua New Guinea, Canada, United States, Namibia, South Africa and Australia. Stefan holds a BAppSc (Geology), MSc (Exploration Geology), is a Microsoft Certified Systems Engineer, a member and CP (Geo) of the AusIMM.

#### Mark Murphy / General Manager and Principal Consultant-Perth



Mark is a specialist resource geologist with over 20 years experience in WA's mining and resources industries. In his previous role as a Principal Geologist, (Geostatistics) with Rio Tinto he consulted on Iron Ore Expansion Projects within the Group. This role involved the establishment of advanced geostatistical simulation methods for resource evaluation, modelling of ore streams for mine and port blending, mentoring of resources estimation group, advice to management on JORC Code compliance and reporting, auditing of resource models. Mark's experience covers a wide range of commodities in a variety of geographic locations and geological settings, including rare

earths, diamonds, bauxite, iron ore, manganese, tin, mineral sands, lead, copper, nickel, PGE's, and gold. Mark holds a BAppSc (Geology), a Postgraduate Certificate in Geostatistics, and a MSc (Mathematics & Planning).

#### Dr Isobel Clark / Principal Consultant – Perth

Isobel is a professional Mining Engineer who has been involved in consultancy work for almost 40 years, almost exclusively in the field of mineral resource and reserve estimation. Her experience covers the whole spectrum from public resource / reserve statements – reporting under NI43-101 and JORC Code – through to working at the grade control stage in producing mines. Isobel has experience in a wide variety of minerals and mining methods on six continents and has been involved in resource estimation for most commodities, from coal to off-shore diamond projects. Mineralisation types range from stockwork through hydrothermal veins to massive sulphides, whilst resource and reserve estimates have been provided for mining methods including back-stopping, cut and fill, open stoping, room and pillar and open pit block-by-block evaluation. She is a Fellow of the IMM and of the SAIMM, a Chartered Engineer in Europe and was

recently accorded Qualified Person status by the MMSA in the USA. Isobel has a BSc, MSc, DIC, PhD, FSS and memberships with FIMMM, FSAIMM, CEng and QP.

### **Ian De Klerk / Principal Consultant**



Ian graduated with Bachelor of Science (Hons) degree in 1985 from Rhodes University in South Africa. Ian started his career as a project Geologist with the South African Development Trust Corporation Limited which involved extensive gold base metal exploration for both syngenetic stratabound and epigenetic shear zone-hosted deposits. Ian worked for Anglo American Corporation's Coal Division from 1989 to 1994 and again between 2001 to 2007. His initial responsibilities included planning and supervision of drilling programmes, evaluation and correlation of down-hole geophysical data as well as deposit modelling and resource estimations. Later Ian was responsible for geological data acquisition, database management and geological modelling for operating collieries and new projects as well as resource and reserve reporting. Ian has also worked for Sasol Coal and HolGoun Energy in the areas of coal, coal bed methane and uranium resources. Ian joined Xstract following a 2 year role as Principal Geologist and Group Manager (Coal Geology) of an international consultancy in Brisbane. Ian's specialties include coal due diligence and technical reviews, coal quality and product interpretations, coal exploration advice and planning, geological modelling and documentation of coal resources in accordance with the JORC Code. He is a Minescape and Minex software user. Ian has an MSc (Exploration Geology), Graduate Diploma of Engineering (Mining), and is a member of the AusIMM.

### **Matthew Readford / Principal Consultant**

Matthew Readford has 23 years' experience in Mining and Management Consulting. His mining experience ranges from resource estimation, feasibility and operational studies, independent expert reviews to business process and information technology system optimisation for a wide range of projects throughout the world. Commodity and mining settings include open pit and underground gold, copper, bauxite, lead-zinc-silver, nickel, coal, uranium and evaporites. Matthew's project locations include Australia, New Zealand, Fiji, West and South Africa, the Middle East, Russia, Indonesia, and South America. He has also worked in Management Consulting, Operational, Financial, Safety and Technology Management roles in other industry sectors. Matthew holds a BSc Hons (Geology), MBA, and is certified in Prince2 Project Management and also a member of the AusIMM along with being a committee member of the AusIMM South East Queensland Branch.

### **Patrick Rice / Principal Consultant – Perth**



Patrick has over 30 years' experience in the mining industry, during which time he gained a wealth of experience in various roles within the Anglo American group of companies, in the fields of Exploration, Geo-sciences and Mineral Resources, Surveying and Mine Planning, as well as Mining Economic assessments. This broad range of skills and extensive experience base offers unique flexibility, specifically in broad based due diligence studies, corporate governance / technical reviews, and asset optimization reviews, which are Patrick's speciality's. Patrick holds a MEng (Mineral Resources), a Grad Dip Eng. (Geostatistics/Geology), is a registered professional natural scientist (Pr.Sci.Nat) at the South African Council for Natural Scientific Professions (SACNASP), a registered Mine Surveyor with the South African Council for Professional Land and Technical Surveyors (PLATO), and a Fellow of the AusIMM (FAusIMM).

### **Shaun Hackett / Principal Consultant - Perth**



Shaun is a geologist with 19 years mining industry experience which includes exploration, mining geology, mineral resource evaluation. Shaun has a wide range of geological expertise, ranging from technical reviews, due diligence, sampling and reconciliation, resource estimation, database/computer management, feasibility studies and training. Shaun's experience covers a range of commodities in a variety of geographic locations and geological settings, including resource projects in Gold (Australia, Brazil, Canada, Ghana, Mali, Romania, Saudi Arabia, South Africa), PGE (Finland, South Africa), Iron Ore (Australia, Brazil), Nickel Sulphide (Australia), Nickel Laterite (Australia, Colombia, New Caledonia, Philippines), Mineral Sands (Australia, Egypt, South Africa), Diamonds (Australia, South Africa), Copper (Australia, Peru, Philippines).

## **Trevor Ellice / Senior Consultant**

Trevor is an economic geologist with high level skills in mining, leadership, and resource estimation. With over 20 yrs in the industry, Trevor is most familiar with base and precious metals, having worked in a variety of geological terranes across Australia. During his career Trevor has lead wealth creation through exploration success and innovation at several projects, most recently at Rosebery in Tasmania. His interests include mining finance, with post graduate qualifications in mineral economics, and geostatistics.

## **Andrew Grieve / Senior Consultant**

Andrew's experience spans nearly 20 years in a variety of deposit styles, settings and commodities within Australia and overseas. Within this time Andrew has gained a diverse range of experience in most aspects of open pit production and resource definition environments. Expertise includes; project start up, grade control and blasting methodology reviews, training and mentoring, geological input into grade control, project management, and ore loss and dilution minimization.

## **Stephanie Gotley / Senior Consultant - Perth**

Stephanie has 15 years experience as a geologist in the mining industry. In 1995 she worked as a geologist in mining and then exploration at the Higginsville and Darlot gold mines in Western Australia. From 1996 to 2004 she held positions as a mine geologist and then project geologist at the Granny Smith Gold Mine in the Western Australian goldfields, where she was involved in mine geology, resource development drilling, resource modelling and grade estimation for the gold deposits of Sunrise, Windich, Keringal, Granny Deeps, Jubilee and Wallaby. Prior to joining Xstract, Stephanie worked as a consultant resource geologist with FinOre Mining Consultants and Snowden in Perth from 2004 to 2010 where she gained experience on geostatistical, resource modelling and estimation projects for a variety of commodities including gold, platinum, nickel laterite, base metals, bauxite, iron ore, manganese and vanadium. Stephanie is familiar with Vulcan, Datamine and Supervisor software, and is currently undertaking further study in geostatistics.

## **John Everard / Senior Consultant - Perth**

John has over 25 years experience working as a geologist in WA's mining and resource industries. In John's previous role at Digirock as their Training Manager, he developed and trained young geologists with an aim of building their skills and knowledge in managing drilling programs. John also worked for nine years at WMC Hill 50 working through various roles from open pit mine geologist to senior geologist assisting with developing and maintaining the mineral resource and ore reserve. This was followed by eight years at Sons of Gwalia as senior project geologist and then senior mine geologist. During this time John worked on the Marvel Loch feasibility study and developed training programs for geologists while studying for an MBA degree in business improvement. John has also worked as a business improvement consultant in PNG. His strengths lie in his ability to review work practices and work habits and suggest ways of improving these work practices. John holds a BAppSc (Geology), and a MBA (Business Improvement).

## **Craig Williams / Senior Consultant**

Craig is a geologist with more than 15 years of experience in the mining industry. During this time he has gained a broad range of experience covering the fields of mineral exploration (targeting, project management and resource definition), resource estimation, mining geology, grade control, auditing and review of mineral resources and financial valuation. He has worked primarily in coal, diamonds and iron ore with additional experience gained in PGE's, gold and bauxite as well. Craig's career started with leading mining companies such as De Beers and Anglo Coal before he moved into the consulting arena, the last 5 years being spent with Snowden and Xstract Mining Consultants. Craig holds a BSc Honours (Geology), MSc (Geology), a Graduate Diploma in Engineering (Mining) and is a member of the AusIMM (MAusIMM).

## **James Carpenter /Senior Consultant**

James has 11 years of geological experience in open pit mining, exploration and data management. He has also been involved in exploration and drilling for submarine massive sulphide deposits on the seafloor in the South West Pacific. James is currently undertaking his Masters in Geostatistics. Geological experience includes mine geology, brownfields exploration, sampling and reconciliation, database management (minerals and coal), seafloor mineral exploration, QA/QC studies and geostatistics. His commodity experience is in base metal sulphides, uranium, copper/gold and coal. James holds a BAppSc (Hons) and is a Member of the AusIMM.

## **Celeste Grobler / Consultant**

Celeste has several years of exploration and mining experience in both underground and open pit mine geology. Celeste has consulted since 2008 where she did data validation, database management, QA QC, geological modelling and resource estimation. She has experience/exposure to a vast collection of software and a range of commodities including gold, copper, platinum, vermiculite (industrial mineral), bauxite, and uranium. Celeste holds a B.Sc Hons (Geology) and is a member of the AusIMM.

## **Emma Harding / Senior Geologist**

Emma has 2 years of mining industry experience in coal exploration in both greenfields and in-pit areas, supervising Exploration drill programs and managing geological data. Geological experience includes sampling, structural interpretation; borehole correction and correlation, database establishment, initiating and driving drill site management and QA/QC studies. Her commodity experience is predominately in coal. Emma holds a B.Sc. (Geology) and is a member of the AusIMM.

## **Nick Anderson / Consultant (Technology)**

Nick has extensive experience as a Software Developer, supported by formal qualifications including a Bachelor of Science with Honours (Earth Science) and a Masters in Science (Computing in Earth Science) which he obtained in 1998. Nick joined Gemcom as a Senior Software Developer in 2005 where he worked on their desktop geology and mine planning software Minex, Whittle and Surpac. During this time, he developed software to integrate software with a variety of data sources, integrate new and old software packages, and made enhancements to performance and usability of block model estimation. His experience is in project planning, analysis and design, implementation and delivery across geographically dispersed teams (incorporating Australia, India and North America).

## **David Green / Associate-Coal Geologist**

David has over 26 years of mining industry experience, and his career has spanned from exploration to mining geology positions in a number of senior coal geologist roles and locations throughout Australia. His role as Director and Principal Consultant Geologist of G.E.M.S (1997-Present) involves managing a geological based team of consultants with disciplines in coal exploration management, resource evaluation and database/information technology for a variety of companies. He and his team have worked recently with Macarthur Coal, Millmerran Power Partners, Bowen Central Coal, and Xstrata Coal Qld/MIM, and in the past for JBMS, QGS, Energy Minerals, Allied Queensland Coalfields, CSIRO, and Shell Coal. He is a Competent Person for reporting Coal Resources and has assessed geological data for resource audits, feasibility studies, and due diligences. David holds a BSc Honours (Geology), and is a member of the AusIMM and the Geological Society of Australia.

## **Peter Swiridiuk / Associate – Exploration & Geophysics**

Peter recently worked as Managing Director for Coppermoly Ltd in the discovery and exploration of porphyry and breccia related copper-gold-molybdenum deposits in Papua New Guinea. Peter has spent over 20 years managing the exploration, discovery and resource definition for gold, copper, silver, molybdenum, coal and diamond deposits in Papua New Guinea, Solomon Islands, New Caledonia, Mexico, Middle East, Cyprus and Australia. Peter has reviewed exploration data for over 20 projects in Papua New Guinea and written NI43-101 reports for over ten projects. He has had extensive technical involvement on numerous deposits including the Hatta copper mine in Oman, copper-gold-silver resources in Mexico, the Roseby copper deposit in Queensland and the Seppelt Diamond deposit in Australia. Peter has a BSc (Hons) (Geophysics) and a DipEd and is a member of the Australian Institute of Geoscientists (“AIG”).

## **Alan Bayrak / Associate-Geology-CSG and Basin Analysis**

Alan is a multi-disciplinary exploration geologist with over 16 years of local and international exploration experience in oil-gas and coal areas in various geographical territories, including Queensland, New South Wales, Otway Basin, Irish Midlands, Thrace Basin, Western Black Sea and Carpathians. Alan’s experience includes district exploration, target development, reserve assessments and CSG acreage management, Gas-in-Place (“GIP”) estimations (deterministic and probabilistic) and technical evaluation of the CSG prospects, qualitative and quantitative analyses of sedimentary basins, analysis of existing geological data, generation of exploration targets and producing technical reports, technical analysis of coals and coal petrography, management of CSG exploration drilling programs, quantitative assessment of the CSG prospects, including desorption, gas composition, adsorption, saturation, coal tests, permeability and reservoir properties. Alan holds a BSc (Geological Engineering), MSc (Petroleum Geology) and a PhD (Exploration Geology).

## **Ricardo Valls / Associate – Geology & Exploration, Toronto**

Ricardo is a professional geologist with more than twenty-five years in the mining industry. He is fluent in English, French, Spanish, and Russian and has been involved in a wide variety of projects world-wide (Canada, Africa, Russia, Indonesia, the Caribbean and Central and South America), including regional reconnaissance to local mapping, diamond drilling and RC-drilling programs, open pit and underground mapping and sampling, geochemical sampling and interpretation, and several exploration techniques pertaining to the search for diamonds, PGM, gold, nickel, silver, base metals, industrial minerals, oil & gas, and other magmatic, hydrothermal, porphyritic, VMS and SEDEX ore deposits. He has particular strengths in the acquisition of new properties, geochemical and geological studies, management and organisation, geomathematical analysis and modelling, compositional data analysis, structural studies, database design, QA/QC studies, exploration studies and writing technical reports, including NI43-101 reports. Ricardo is a P.Geo. registered in the provinces of Ontario and Quebec.

## **Andrew Bowden / Associate, Exploration & Geology**

Andrew Bowden has over 30 years mining and mineral exploration experience plus 10 years in geological site selection and characterization for radioactive waste disposal. He has a multidisciplinary geological knowledge gained through working in a number of specialist areas with various clients and has a background of deposit discovery which includes the Az Zabirah bauxite deposit in Saudi Arabia and the Kayelekera uranium deposit in Malawi. He has special interests in uranium exploration, geostatistics and strategic decision making using evidential reasoning. Andrew holds a Combined Honours BSc in Chemistry and Geology, an MSc in Mineral Exploration, is a Fellow of the Geological Society of London, a Chartered Geologist and a Chartered Scientist. He is a CP (Uranium Geology) qualified under the ROPO (Recognised Overseas Professional Officer) provisions of the AusIMM.

## **Elizabeth Haren / Associate, Training & Geology**

Elizabeth has skills and experience in resource estimation, reconciliation, conditional simulation and QA/QC for both open-pit and underground applications as well as training and technical mentoring in these fields. Before starting her own company, Haren Consulting, in 2007 she worked with a leading resource industry consultancy for over five years and with a colleague built a successful Technical Mentoring division. She strives to continue adding value to clients business through developing their technical abilities while helping to achieve immediate deadlines for project work. Elizabeth has worked across a number of geological environments, countries and commodities including gold, iron ore, platinum group elements, base metals, uranium and bauxite. Elizabeth is proud to be a Board member of the AusIMM Chartered Professionals and the Australian Institute of Company Directors. Elizabeth has a BSc (Geology, Geography) from the University of Newcastle is a Member of the AusIMM (MAusIMM) and a CPGeo.

## **Corporate Services**

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### **Jeames McKibben / General Manager and Principal Consultant**



During his more than 16 years experience in the mining and mineral industry, Jeames has served in a diverse range of roles including corporate consultant, project manager, geologist and analyst. Jeames' most recent role was as the Divisional Manager for Snowden Mining Industry Consultants Pty Ltd's Corporate Services Division. He has a strong record in project due diligence, independent technical review, valuation, deposit evaluation and the promotion of best practice strategies in the workplace. As a corporate consultant he specialises in valuations and Mineral Expert Reports for equity transactions and Independent Technical Reports in support of project finance. He has

assisted numerous mineral companies, financial and legal institutions in securing regulatory approvals for IPOs and other secondary filings on the following international exchanges: Australian Securities Exchange, Alternative Investment Market, London Stock Exchange, Johannesburg Securities Exchange and Toronto Stock Exchange. Other mandates include technical due diligence in support of information memoranda, divestments, acquisitions and mergers, Pre-Feasibility Studies and independent Competent Persons' Reports. Jeames has a MBA and a BSc (First Class Honours), and is a member of the AIG and the AusIMM. Jeames was recently appointed to a joint AusIMM/AIG Committee to review the VALMIN Code.

## Manish Garg / Manager & Principal Consultant - Evaluations



Manish has some 20 years mining experience in mining operations, marketing, corporate roles and consulting. Before joining Xstract Manish has managed business analysis, planning and improvement functions at Rio Tinto Coal, BHP Billiton Illawarra Coal, WMC Resources, Oceanagold and Pasminco apart from working as Metallurgy Manager at base metal operations. Manish's experience includes market intelligence, due diligence, metal and concentrate marketing, valuation, strategic planning and optimizing business performance. He seeks to enhance business performance and profitability by analysing business performance and deploying appropriate business planning and improvement systems. Manish has managed and worked on due diligences, feasibility studies and reviews for banks, financial investors and mining companies on worldwide projects including Australia, New Zealand, India, South Africa, Congo, Zambia, Kazakhstan, Peru & Bolivia. Manish is a BEng (Hons) (Metallurgical Engineering), Master of Applied Finance, and a member of the Financial Services Institute of Australia.

## Jonathan Bell / Principal Consultant – Perth



Jon is a geologist and mineral economist with over 10 years experience in exploration, resource definition, mining and project valuation gained by working with various Western Australian mining and consulting companies. Jon specialises in the field of mineral asset valuations, in which he is a practitioner, trainer and innovator of advanced methodologies. Since gaining his Bachelor's degree in Applied Geology, Jon has complemented his geological skills with a Masters in Mineral Economics. Jon is currently pursuing a PhD in Mineral Economics with the view towards deriving new valuation methods and quantifying mineral market characteristics using the market-based approach. Jon is a Graduate of the Australian Institute of Company Directors and Member of the Australian Institute of Geoscientists, the latter of which he also serves on the Western Australian Branch Committee. Jon is a current member of a joint AIG/AusIMM Committee reviewing and updating the VALMIN Code. In addition to his technical and academic pursuits, Jon holds non-executive directorships within the private sector.

## Francois Grobler / Principal Consultant – Perth



Francois has more than 17 years experience as a geologist and project analyst in the corporate environment, as well as underground and alluvial operations in South Africa. Francois has gained extensive experience in technical and economic project evaluation, which includes substantial exposure to quantitative risk analysis and decision-making under uncertainty. He has been involved in valuations of various projects and operations in a number of commodities and countries for feasibility studies, stock exchange listings, M&As, JVs and legal proceedings. Francis specialises in Integrated Risk Assessment, which includes whole-of-project risk and uncertainty evaluation. This approach includes both qualitative and quantitative risk analysis using tools such as Monte Carlo Simulation, Discreet Event Simulation, Real Options as well as Optimisation (MILP) under uncertainty. Francois has a MSc Eng (Min Econ), Dipl (Fin Mngmt), PR. Sci. Nat and is a member of MAusIMM and MSAIMM.

## Colin Hannah / Principal Consultant (Plant and Machinery)



Colin is plant and machinery equipment valuation professional with more than 25 years experience undertaking assignments in Australia, Africa, Europe and South-East Asia. Colin completed his professional education and training in South Africa and then worked with most of the major international mining houses operating in Africa. Prior to joining Xstract in 2009, Colin was the Director of Plant and Machinery Valuations in Queensland for CBRE as part of its Worldwide Valuation & Advisory Services. Colin's valuations are normally either for financial or insurance purposes. The valuations are generally completed by inspecting and defining the technical specification of the assets requiring valuation, analysing market evidence and providing accurate valuation advice for both standard and specialised assets. The output is often extended to updating the content of client's existing fixed asset registers for book and tax purposes, this is often part of mergers, acquisitions and takeovers as well as being part of the Purchase Price Allocation regime for tax consolidation. Colin's financial valuation advice has previously been reviewed and accepted by clients' auditors and the Australian Tax Office. Colin has a Quantity Surveyor degree from the Witwatersrand University in Johannesburg, and a Fellow of the Australian Property Institute.

## **Shaun Barry / Senior Consultant**

With over 20 years experience Shaun is a mineral industry professional experienced in mineral economics, mining business analysis, and minerals marketing. His previous role as a Senior Marketing Specialist Shaun worked for Rio Tinto Alcan in their Brisbane offices. His main focus was to provide support in strategic commercial projects and synergy projects in the acquisition of Alcan with emphasis on business improvement. Prior to this Shaun was a Senior Sales Specialist for Rio Tinto Alcan (2006-2007). Shaun has worked for Anglo Coal Australia as a Senior Business Analyst (2004-2005), Anglo Platinum's Marketing Manager (1999-2004) and prior to this as a Mining Share Analyst, Mineral Economist and Mine Geologist in South Africa. Shaun has a BSc (Hons) (Geology), MSc (Engineering-Mineral Economics) and a Diploma in Investment Management.

## **Antonio Egana / Senior Consultant**

Antonio is a geologist with more than 23 years of operational and consulting experience in Chile, Brazil, Peru, Bolivia, Canada and Australia. In North and South America, Antonio worked previously as a Project Geologist for several major mining houses including Cominco, Rio Chiles and Falconbridge and as a Consultant with Cominco American Inc. He immigrated to Australia with Xstrata Copper as a Contract Geologist in 2007. His most recent role was with Pincock Allen Holt where he was Senior Geologist and Business Analyst based in Australia and Chile. Antonio's technical capabilities include QAQC, due diligence, geological and mineral economics, mining investment analysis and technical reporting. Antonio has a Master of Science in Mineral Exploration, a Graduate Diploma in Commerce (Finance) and is a member of the AusIMM.

## **Michael Tyndall / Senior Consultant**

Michael is a geologist with more than 19 years combined experience including 10 years in marine and terrestrial diamond exploration and mining, five years in mineral resource management on deep level gold mines in southern Africa and four years as a mineral industry consultant. Michael's key expertise lies in mineral project feasibility, technical due diligence studies, technical reporting and mineral asset valuation.

As a mining consultant, Michael has previously worked for Venmyn Rand in South Africa, where he assisted in the compilation and preparation of techno-economic and valuation reports for a variety of commodity and mineral assets, primarily for stock exchange listings and project capital funding. In January 2009, Michael relocated to Australia and joined Snowden's Corporate Services Division where he was involved in mineral asset valuations, due diligence studies and technical reporting. In June 2010, Michael joined Xstract's Corporate Division as a Senior Consultant. Michael holds a BSc (Honours) degree and Graduate Diploma in Mining Engineering. Michael is also a member of the Geological Society of South Africa and the AusIMM.

## **Christopher Stephens/ Associate – Corporate Services - Perth**

Christopher Stephens is a geologist with 30 years professional experience in the exploration, mining and academic sectors. Christopher has a strong technical background and is a firm believer that discipline across all of a company's activities is fundamental to achieving strategic corporate, exploration and mining goals. He acts as an independent consulting geologist on behalf of a number of clients in the areas of project review and corporate strategy, including: developing strategic direction papers for clients; working with the executive and via interaction with boards of directors as required; setting corporate and technical standards for geological activities, consistent with the statutory framework applicable to the area of exploration; reviewing, assessing and developing new project opportunities. Christopher has prepared independent expert reports on projects worldwide, including Independent Geologist's Reports and Independent Technical Valuations, and has been involved with evaluations ranging from exploration portfolios to feasibility studies. As an independent consultant, Christopher gives expert specialist advice to individuals including project developers, company management and industry analysts. Christopher has a BSc (First Class Honours) and PhD, and is a member of the AIG and the AusIMM.

## **Stephen Redford / Associate – Corporate Services and Mining, Sth Africa**

Stephen has a MSc (Mining Engineering) with experience in mine planning, scheduling, mining economics, resource and reserve management, and competent persons and public (NI43-101 and SAMREC) reports with an emphasis on mine planning and financial valuation aspects in those reports. Stephen's core focus is on utilising a wide variety of modelling tools to improve the decision making processes within the mining industry. These tools include traditional Mine2-4D and EPS modelling to more modern monte-carlo

simulation, fuzzy logic, genetic algorithms and neural networking. Stephen has a strong IT systems background with expertise in SQL scripting, VBA and other software development tools.

## **Luis Martinez / Associate – Real Options**

Luis has an engineering background with over 15 years of experience in mine engineering, geostatistics, risk analysis and project evaluation. He finished his Doctorate in Mineral Economics - “Strategic open pit mine project evaluation using real options and allied econometrics”, having completed his Masters in 2003. Prior to joining Xstract in 2009, Luis worked as a valuation specialist for GEMCOM International, a Research Fellow and Research Assistant at University of Queensland and QUT, as well as a mining engineer and consultant for several companies in Peru. He has published and presented numerous papers on project evaluation, optimisation and strategic risk management, the most recent being at the AusIMM Project Evaluation Conference 2009. Luis is a member of the AusIMM, SME, Minerals Economic Management and Professional Risk Managers International Association.

## **Mining**

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### **Kevin Irving / General Manager and Principal Consultant**



Kevin has some 30 years mining engineering experience in mine management, corporate roles and consulting. Before joining Xstract, Kevin was Group Manager-Coal for Snowden Mining Industry Consultants, based in Brisbane. Previous to this, Kevin was Vice President Operations for UK Coal Plc where he had a successful track record of managing a group of coal mines with a combined turnover of circa AU\$1,200 M. Under his leadership, safety performances improved by 10%, including a 5-year fatality free period, productivity by 11%, reduced costs by 4%, and increased profitability by AU\$35 M. Kevin’s experience includes an in-depth knowledge of leading people, financial management, planning, scheduling and forecasting and consulting. His skills lie in establishing teams of diverse people to conduct concept, pre-feasibility, feasibility studies, mine optimisation, due diligence and technical audits. Kevin is a CEng with a MBA, BSc (Hons) and is a Fellow of the AusIMM and the Institute of Material, Minerals and Mining (CEng).

### **Gary Methven / Principal Consultant**



Gary is a Mining Engineer with 20 years experience in underground mining, mine planning, consulting, construction and project management. He has several years of experience in the management of technical teams and technical studies. He has expertise in deep underground flat alluvial gold deposits, hard rock mining methods for narrow vein ore bodies, underground mine infrastructure design and planning, mine production scheduling and financial evaluation. Gary has undertaken a number of Technical reviews, Feasibility and Pre-feasibility studies for green and brown fields projects and is a Competent Person as defined by the JORC code for Ore reserve estimation and review. Gary has experience in Project and construction management, Shaft sinking operations management, contracts management, budget control and cost estimating. Commodities worked in include gold, lead, zinc and copper in Southern Africa and Australia. Gary holds a BSc (Mining Engineering) and is a Member of the AusIMM and a Registered Professional Engineer of Queensland.

### **Tim Horsley / Principal Consultant**



Tim has over 30 years international experience in the mining industry including all aspects of mine planning and design from primary infrastructure to detailed stope and development design, feasibility study through to new mine development, production and mine closure. Primarily underground, hard rock, Tim has worked in Zambia, Oman, UK and Australia for ZCM, Oman Mining Company, MIM (Mine Planning Manager), AMC Consultants (Group Manager) and Coffey Mining (Mining Manager). Tim has specific expertise in mine design & planning, optimisation, financial modelling, mining method selection, differential cut-off grade analysis, ventilation, airblast impact assessment, optimum pit/underground transition, life-of-mine and strategic planning. Tim has a BSc Mining engineering (Hons), is a Member of the AusIMM, Member Institute of Materials, Minerals & Mining, and a Chartered Engineer (UK).

## **Donald Elder / Principal Consultant**



Donald has over 20 years experience in the mining industry and has specialised in the areas of Mine Planning and Design. He has several years of experience in the management of technical teams and technical studies. He has expertise in deep underground flat alluvial gold deposits, hard rock mining methods for narrow vein ore bodies, underground mine infrastructure design and planning, mine production scheduling and financial evaluation. Donald has worked for Avgold (1997-2003), Harmony Gold Mining Company (2003-2004), Nahana Technical Services (2005-2008) and First Uranium (2008-2011). He has been employed in consulting roles for 3 years and his technical experience covers a range of commodities and mining settings. Donald has a GDE (Mining), NHD (Min Resource Management) and is a Member of the AusIMM.

## **Xavier Hill / Senior Consultant - Perth**

Xavier has 7 years experience within the mining industry, primarily in underground metalliferous operations. Upon graduating, Xavier worked at Newmont's Jundee and Pajingo operations, where he completed his underground time and worked as a development engineer. He then went on to work at BHP Billiton's Leinster operations where he gained experience as a planning and production engineer. In early 2007 Xavier left Leinster to join the then Jubilee mines at their Cosmos operation where he undertook various roles in mine planning, mine feasibility, project management and operating as underground manager. In his time at Cosmos Xavier realised a number of operational savings and saw through the initial design work, to the completion of the AM2 and AM5 Disseminated orebodies. Xavier holds a Bachelor of Engineering (Mining), an MBA and MAusIMM.

## **Chris Faast / Consultant**

Chris graduated with a Bachelor of Engineering (Hons) from the University of South Australia in 2003. He worked at Darlot Gold Mine as a graduate, finishing in 2005 as mine ventilation officer and senior production engineer. Chris started his consulting career with Snowden and furthered his strengths in underground hard rock design and mine planning. Through consulting exposure to mining projects and studies around the world, Chris has added open pit design and planning skills to his knowledge, and further strengthened his underground skills with senior mining engineer and long term planning roles at sites within Australia. Commodities worked in include coal, gold, copper, lead, nickel, zinc and uranium on projects in Africa, South America and Australia. Chris is a Member of AusIMM.

## **Charlotte Nangolo / Consultant – Perth**

Charlotte has 6 years of mineral industry experience, primarily in open pit mining. Upon graduating, she worked for AngloGold Ashanti's Navachab Gold mine in Namibia where she completed her graduate programme and worked as a short-term planning engineer. She then went on to work at Rio Tinto's Iron Ore operations in the Pilbara region of Western Australia where she covered various roles in operations planning and technical services, focusing on scheduling and designing. After Rio Tinto, Charlotte worked for a stockbroking firm as a resource analyst focusing on uranium junior exploration and producing companies, of which the majority are ASX and TSX listed. Charlotte has lectured on financial valuations of mining projects to undergraduates and run an Introduction to Mineral Resource Management course at the University of the Witwatersrand while completing her MSc (Mineral Economics). Charlotte holds a Bachelor of Science in Engineering (Mining) and Masters of Science in Engineering (Mineral Economics).

## **Rajesh Singh / Mining Engineer**

Rajesh has over 16 years experience as a Mining Engineer in coal mines throughout India. His main focus was on the management, direction, mine design, planning and equipment allocation in underground coal operations. He has worked in the Western Coalfields (1993 – 2010) in both open cut and underground before moving to Australia. His experience lies in operational improvement with a wide variety of mining methods and equipment. Rajesh has joined our Brisbane team. Rajesh has Bachelors of Engineering degree in Mining from Nagpur University and a First Class Managers ticket.

## **Eduardo Valenzuela / Associate**

Eduardo Valenzuela has 30 years experience working as a mining engineer within a range of commodities within the mining industry including consulting and management. Eduardo worked as a Mining Manager for Ferraus Limited (2008-2009) and has worked for Sinclair Knight Merz, Sundance Resources, International Finance Corporation, Anaconda, Global Mining Services, and BHP (Copper and Engineering). Eduardo has worked globally including countries such as Chile, Santiago, Washington, USA,

and Perth, Australia. Eduardo's experience includes project and study management, management of exploration projects, project evaluations, and mine optimisation studies in iron ore, copper, gold, nickel, and coal. Eduardo's qualifications include a BSc (Hons) in Mining Engineering, MBus (International Management). He holds a Quarry Manager's Certificate of Competency (Western Australia).

### **Phil Morriss / Associate**

Phil has more than 35 years of experience in Open Pit Mining. This includes 25 years of large open pit precious and base metals mining experience with RIO, BHPB, and Placer Dome in a range of technical and managerial roles in Australia, Papua New Guinea, South America and Africa; and 4 years as CEO of an International Mining Contractor operating in Ghana and Tanzania in Africa. His technical expertise covers soil mechanics (foundations), rock mechanics (probabilistic rock slope design), mine engineering and equipment selection, operational and maintenance audits, strategic planning, and operations and change management. Phil also has consulting experience being responsible for global mining activities for the Snowden Group for 3 years from 2002. For 2 years from January 2007 Phil provided global Mining Engineering and strategy support to Sandvik Mining and Construction, with particular emphasis on developing the in-pit crushing and conveying ("IPCC") business. Phil has a BSc (Hons) in Civil Engineering (University of London, 1973) and is a Member of the AusIMM.

## **Environment**

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### **Roger Dawson/ Principal Consultant**



Roger is an environmental scientist who has worked with the mining industry for 20 years in most phases of mine project development and operations. Roger's previous roles include applied research in mined land rehabilitation (Queensland; Tasmania), mining regulation (Queensland; Victoria) and mine environmental consulting (Queensland; Western Australia). Roger has experience with most major mining commodities including black coal, brown coal, copper, gold, nickel, manganese, mineral sands and extractive materials. As an environmental consultant, Roger's skills provide the opportunity for a wide range of environmental services during project development including due diligence, co-ordination of baseline studies, scoping studies, feasibility assessments, impact assessment ("EIA"), environmental management plans ("EMP"), bond assessments, environmental approvals and licences. At operating sites, Roger's experience extends to environmental management systems ("EMS"), operational procedures, third-party audits, liability assessments, annual reporting and closure planning. In addition, Roger has worked with the upstream petroleum, gas and pipeline industry in Queensland. Roger holds a BSc (Hons)(Botany), PhD (Environmental Science) from the University of Tasmania and is a member of EIANZ.

## **Processing**

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### **Tom Owen / Associate-Processing**

Tom is a Metallurgical Engineer with more than 30 years experience in the management, technical operation, design and construction of metallurgical plants. He has been a metallurgical consultant since 1987 initially with Gold Fields of South Africa and since 1997 as Metallurgical Solutions. He has a wealth of experience and expertise in gold and base metal ore beneficiation, from pit head operations through to the smelting and refining. Tom has been involved in a number of technical reviews, feasibility and pre-feasibility studies for clients in Africa, Europe and Oceania. Metallurgical designs to minimise environmental impact of process plants has been a core competence. Commodities worked in include gold, uranium, platinum, tin, nickel, lead, zinc, copper and vanadium. Tom holds a BSc (Hon) (Metallurgy) from the University of Wales is a Member of the Institute of Mining Metals and Materials (London) and is a registered Chartered Engineer (UK).

## **Support**

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### **Tanya Bartram / General Manager Corporate & Finance**

With 25 years experience in Accounting Tanya started her career in Canberra as a Tax Accountant with Touché Ross (now KPMG) then branched into small business management and Government consulting. Tanya moved to Perth in 2007 and took up the role of Group Financial Controller of Snowden and more recently has worked as a Resource Sector consultant in the development and implementation of ERP Systems. Tanya is a CPA and is also an Associate member of the AusIMM.

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