Valuation of Mineral and Coal Assets – Challenges and Opportunities

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Focus on Exploration and Mineral Resources

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Content

• Introduction

• Codes, standards, guidelines and industry practice

• Common Valuation Methods

• Conclusions
Introduction

What is being valued?

Components of mining company’s share price:

- Mineral properties
- Other assets and liabilities (e.g. cash and debt)
- Commodity markets and general market sentiment
- Quality of management
- Market recognition and liquidity
Introduction

What is being valued?

As defined in the VALMIN Code (2015), mineral assets comprise all property including (but not limited to) tangible property, intellectual property, mining and exploration tenure and other rights held or acquired in connection with the exploration, development of and production from those Tenures.

This may include the plant, equipment and infrastructure owned or acquired for the development, extraction and processing of Minerals in connection with that Tenure.
Introduction

What is the purpose of the valuation?

VALMIN Compliant/ Non-Compliant Valuations:

• Value Opinion vs Full Valuation
• “Technical Value”
• “Market Value” of mineral properties
• “Investment Value”
• “Selling Value”
• “Bidding Value”
• Stamp Duty Disputes
• JV Partners Disputes
• Third-Party Opinion
What is “Market Value”?

“Market Value” is the estimated amount (or the cash equivalent of some other consideration) for which the Mineral Asset should exchange on the date of Valuation between a willing buyer and a willing seller in an arm’s length transaction after appropriate marketing where the parties had each acted knowledgeably, prudently and without compulsion.
Introduction

What is “Market Value”?

• Value that would have been paid
• Open and unrestricted market
• Between informed and prudent parties
• Acting at arms length
# Introduction

<table>
<thead>
<tr>
<th>Project development stage</th>
<th>Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early stage exploration</td>
<td>Mineralisation may or may not be defined, but where Mineral Resources have not been identified.</td>
</tr>
<tr>
<td>Advanced exploration</td>
<td>Considerable exploration has been undertaken and specific targets identified that warrant further detailed evaluation, usually by drill testing, trenching or some other form of detailed geological sampling. Sufficient work has been completed on at least one prospect to provide both a good understanding of the type of mineralisation present and encouragement that further work will elevate one or more prospects to the Mineral Resource category.</td>
</tr>
<tr>
<td>Pre-development</td>
<td>Mineral Resources have been identified and their extent estimated (possibly incompletely), but where a decision to proceed with development has not been made. Properties in the early assessment stage, properties for which a decision has been made not to proceed with development, properties on care and maintenance and properties held on retention titles are included in this category if Mineral Resources have been identified, even if no further work is being undertaken.</td>
</tr>
<tr>
<td>Development</td>
<td>Tenure holdings for which a decision has been made to proceed with construction or production or both, but which are not yet commissioned or operating at design levels. Economic viability will be proved by at least a Pre-Feasibility Study.</td>
</tr>
<tr>
<td>Operating</td>
<td>Tenure holdings, particularly mines, well fields and processing plants, that have been commissioned and are in production.</td>
</tr>
</tbody>
</table>

Source: VALMIN Code, 2015
Introduction

Typical information required for valuations:

- An independently validated tenement schedule outlining tenement number, area (in square kilometres), ownership (including mineral rights, clawback provisions, royalties, etc.), date of grant, date of expiry, taxes, rents, rates, minimum exploration expenditures, encumbrances, i.e. legal, Native Title, environmental, social
- Details of expenditure history (by tenement) to estimate the value of the exploration information
- Copy of any material agreements and contracts (i.e. service, joint venture, off-take, royalty)
- Any reports outlining recent exploration, such as annual reports
- Reports outlining the potential of the tenements
Introduction

Typical information required for valuations:

• Any Mineral Resource estimates (either current or historical) or exploration target estimate
• Any test work and processing studies
• Any mining, geotechnical, infrastructure or environmental studies
• Previous and/or current feasibility studies or technical studies
• Any valuations or independent expert’s reports on actual or adjacent properties considered relevant (i.e. within the last five years)
Codes

Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves

The JORC Code
2012 Edition

Effective 20 December 2012 and mandatory from 1 December 2013
Prepared by the Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia (JORC)

Australasian Code for Public Reporting of Technical Assessments and Valuations of Mineral Assets

THE VALMIN CODE
2015 EDITION

Effective 30 January 2016
Mandatory for AusIMM and AIG members from 1 July 2016
Prepared by The VALMIN Committee, a joint committee of the Australasian Institute of Mining and Metallurgy and the Australian Institute of Geoscientists
Interaction

Source: VALMIN, 2015
Interaction

Source: McCarthy, 2014
Codes & guidelines

Technical Reporting Codes

• Provide minimum standards, recommendations and guidelines

• Principles of transparency and materiality in reporting

Reporting is subject to interpretation, therefore require greater transparency and consistency.


Materiality
All reasonable information expected

Transparency
Clear, unambiguous presentation

Competence
Work completed by Competent Person

Independence
May be required depending on circumstance

Reasonableness
Impartial assessment that a third party would reach a similar conclusion
Codes

Reporting definitions

Don’t forget about:

- Development stages
- Timing
- Level of technical-economic study
- Level of confidence in all relevant factors, including SEG factors
- Transparent, consistent, balanced reporting
- “If not, why not” basis

Source: JORC Code, 2012
## Competence requirements

### Membership

Member or Fellow of:
- AusIMM
- AIG
- Recognised Professional Organisation with an ‘enforceable code of ethics’

### Experience

Minimum 5 years experience in:
- **Technical Assessment**: Style of mineralisation or type of deposit under consideration; and
- **Activity**: which that person is undertaking

### Experience

- **Technical Assessment**: Minimum 5 years experience in Technical Assessment
- **Valuation**: Minimum additional 5 years (i.e. ten years in total) experience in valuation of mineral assets
- **Familiarity**: VALMIN & JORC Codes, Corps Act, ASIC/ASX policy & court decisions
# Valuation Approaches

<table>
<thead>
<tr>
<th>Valuation Approach</th>
<th>Valuation Method</th>
<th>Development Properties</th>
<th>Marginal Development Properties</th>
<th>Exploration Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>Discounted Cash Flow</td>
<td>Yes</td>
<td>Maybe</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Real Options</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Cost</td>
<td>Appraised Value</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Geoscience Factor</td>
<td>No</td>
<td>Maybe</td>
<td>Yes</td>
</tr>
<tr>
<td>Market</td>
<td>Comparable Transactions</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Option Agreement Terms</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Valuation Approaches

Income Approach:
• Based on expectation of income
• Discounted cash flow method and variations

Market Approach:
• Based on principle of substitution
• Sales comparison/ comparable transactions

Cost Approach:
• Cost of equivalent property
• Appraised value method
• Multiple of exploration expenditures
• Geoscience factor

At least two valuation methods should be considered for each mineral asset.
Valuation of Non-Producing Assets

Why Non-Producing Assets have value?

• They represent potential for eventual mineral production through
• Exploration discovery
• Enhancement of existing mineral resources
• Improved circumstances, (e.g. new roads or higher metal prices)
Valuation of Non-Producing Assets

Why Non-Producing Assets have value?

- New ownership
- A market exists for non-producing mineral properties
- With mineral resources or without mineral resources
- Deals are commonly option or farm-in agreements
Valuation of Non-Producing Assets

Most commonly used methods:

- Actual Transactions
- Comparable Transactions
- Joint Venture Terms
- Past Effective Expenditure/ Prospectivity Enhancement Multiplier (PEM)
- Geoscience Factor (i.e. Kilburn Method)
- SRK Geological Risk
- Metal Transaction Ratio (MTR)
- Yardstick/ Rule of Thumb Method
Comparable Transactions Analysis

- Commonly used in valuations for assets in any stage of development
- No true comparables – mineral properties are unique
- Market size is small with relatively few transactions
- Can use transactions on a number of similar properties to obtain a range of values
Comparable Transactions Analysis

• Complex property deals need analysis to obtain a value of the property
• Can adjust comparable transaction values by property area or by metal contained in resource
• Transaction date is very important since market activity and value change over time
Comparable Transactions Analysis

Use similar characteristics to those of subject property:

- Commodity or group of commodities, e.g. gold
- Political jurisdiction
- Location, access, infrastructure
- Property size
- Geological setting
- Mineral deposit type
- Stage of exploration and exploration potential
- Exploration results and targets
- Activity on neighbouring properties
- Similar resource tonnage and grade, if any
Comparable Transactions Analysis

Option Agreement Analysis/ JV Terms:

- Analysis needed for valuation of market transactions
- Most non-producing mineral property transactions are option or earn-in agreements to earn an interest in the property
- The option or earn-in period may last several years; three to four is common
- Earn-in terms include cash, stock, work commitments and royalties
- Usually first year is firm and subsequent years optional
- Option agreement terms analysis:
  - Schedule of payments and work commitments
  - Estimate probability of realization of future commitments
  - Date of the agreement is the valuation date
 Comparable Transactions Analysis

Published description of the deal:

X Resources can earn a 60% interest in a Rare Earths property of Y Corporation by making payments totalling $600,000 and expending a total of $2,500,000 on exploration over four years. The first year requires $50,000 cash on signing and an expenditure commitment of $250,000. Further optional annual payments and work commitments are shown in the following analysis table.
## Comparable Transactions Analysis

<table>
<thead>
<tr>
<th>Year of Agt.</th>
<th>Commitment</th>
<th>Payment Schedule</th>
<th>Expl. Exp Schedule</th>
<th>Prob. of Realiz’n.</th>
<th>Value Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Firm</td>
<td>$50K</td>
<td>$250K</td>
<td>100%</td>
<td>$300K</td>
</tr>
<tr>
<td>2</td>
<td>Optional</td>
<td>$100K</td>
<td>$500K</td>
<td>50%</td>
<td>$300K</td>
</tr>
<tr>
<td>3</td>
<td>Optional</td>
<td>$150K</td>
<td>$750K</td>
<td>25%</td>
<td>$225K</td>
</tr>
<tr>
<td>4</td>
<td>Optional</td>
<td>$300K</td>
<td>$1,000K</td>
<td>10%</td>
<td>$130K</td>
</tr>
<tr>
<td>Totals for 60% Int.</td>
<td></td>
<td>$600K</td>
<td>$2,500K</td>
<td></td>
<td>$955K</td>
</tr>
<tr>
<td>Value of 100% Interest in the Property (rounded)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1,600K</td>
</tr>
</tbody>
</table>
Prospectivity Enhancement Multiplier

- Based on the principle of “Past Expenditure”
- A premium (or discount) multiplier is applied to the total cost of exploration to date, depending on whether the exploration has enhanced the prospectivity of the ground or not
- Multiplier typically ranges from 0.5 – 3.0
- Historical expenditures must be declared as audited
- Issue – Subjective choice of multiplier value
Kilburn Method

Ranking of appropriate factors applied to a Base Acquisition Cost (BAC).

The BAC represents the average cost incurred by a Tenement Holder or Explorer to identify, apply for and then retain a unit area of the exploration licence of title (Goulevitch and Eupene, 1994), including statutory expenditure costs. The BAC forms the starting value from which a technical valuation range is then estimated.

The factors used for the technical rating include Off-property, On-property, Geology and Anomaly factors. The ranking of these key factors will either enhance or reduce the intrinsic value of a property. A further factor, the Market factor, may then be considered in order to derive a Fair Market Value.
## Kilburn Method

<table>
<thead>
<tr>
<th>Rating</th>
<th>Off Property Factor</th>
<th>On Property Factor</th>
<th>Geological Factor</th>
<th>Anomaly Factor</th>
<th>Quality Factor (Product type)</th>
<th>Location/Infrastructure Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td></td>
<td></td>
<td>Unfavourable geological setting</td>
<td>No mineralisation identified – area sterilised</td>
<td></td>
<td>Unable to access market</td>
</tr>
<tr>
<td>0.5</td>
<td>Unfavourable district/basin</td>
<td>Unfavourable area</td>
<td>Poor geological setting</td>
<td>Extensive previous exploration provided poor results</td>
<td>Low quality with impurities</td>
<td></td>
</tr>
<tr>
<td>0.7</td>
<td></td>
<td></td>
<td>Generally favourable geological setting, under cover or complexly deformed or metamorphosed</td>
<td>Poor results to date</td>
<td>Low quality without impurities</td>
<td>Located at distance to market but supporting infrastructure in development</td>
</tr>
<tr>
<td>0.9</td>
<td>No known mineralisation in district</td>
<td>No known mineralisation on lease</td>
<td>Generally favourable geological setting</td>
<td>No targets outlined</td>
<td>Reasonable quality with impurities</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>Minor workings</td>
<td>Minor workings or mineralised zones exposed</td>
<td>Generally favourable geological setting</td>
<td>Target identified, initial indications positive</td>
<td>Reasonable quality without impurities</td>
<td>Located at distance to market but supporting infrastructure in place</td>
</tr>
<tr>
<td>2.0</td>
<td>Several old workings in district</td>
<td>Several old workings or exploration targets identified</td>
<td>Multiple exploration models being applied simultaneously</td>
<td>High quality without impurities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
<td>Well defined exploration model applied to new areas</td>
<td>Significant grade intercepts evident but not linked on cross or long sections</td>
<td>In proximity to market with appropriate infrastructure in place to access</td>
</tr>
<tr>
<td>3.0</td>
<td>Mine or abundant workings with significant previous production</td>
<td>Mine or abundant workings with significant previous production</td>
<td>Significant mineralised zones exposed in prospective host rock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td></td>
<td></td>
<td></td>
<td>Several economic grade intercepts on adjacent sections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>Along strike from a major deposit</td>
<td>Major Mine with significant historical production</td>
<td>Well understood exploration model, with valid targets in structurally complex area, or under cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>Along strike for a world class deposit</td>
<td></td>
<td>Well understood exploration model, with valid targets in well understood stratigraphy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td></td>
<td></td>
<td>Advanced exploration model constrained by known and well understood mineralisation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td>World Class Mine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Modified after Xstract, 2009 and Agricola Mining Consultants, 2011.
Geological Risk Method

![Diagram](image)

**Exploration Stages**

- **A** Project generation
  - $C_A = \text{Cost}$
  - $EV_A = \text{Expected Value}$

- **B** Reconnaissance
  - $C_B = \text{Cost}$
  - $EV_B = \text{Expected Value}$

- **C** Drill testing
  - $C_C = \text{Cost}$
  - $EV_C = \text{Expected Value}$

- **D** Detailed resource definition
  - $C_D = \text{Cost}$
  - $EV_D = \text{Expected Value}$

- **E** Feasibility study
  - $C_E = \text{Cost}$
  - $EV_E = \text{Expected Value}$

**Geological investigation stages**

**Economic evaluation stages**

$EV = P \times TV - C$

- $P = \text{Probability of success}$
- $C = \text{Cost of each stage}$
- $TV = \text{Target value (NPV of deposit style)}$

**Fig 1** - Schematic diagram of the Geological Risk Method (after Lord *et al*, 2001).
### Geological Risk Method

<table>
<thead>
<tr>
<th>Risk probability $P = P_1 \times P_2 \times P_3 \times P_4$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P1 Source</strong></td>
</tr>
<tr>
<td>The source for the area is not well defined or</td>
</tr>
<tr>
<td>differentiated, and there is extensive evidence of</td>
</tr>
<tr>
<td>mineralisation in the region, so all projects were</td>
</tr>
<tr>
<td>given the value one.</td>
</tr>
<tr>
<td><strong>P2 Pathway</strong></td>
</tr>
<tr>
<td>Very favourable gold bearing structure $&lt; 3 \text{ km}$</td>
</tr>
<tr>
<td>0.9</td>
</tr>
<tr>
<td>Moderately favourable gold bearing structure $&lt; 3 \text{ km}$</td>
</tr>
<tr>
<td>0.7</td>
</tr>
<tr>
<td>Slightly favourable gold bearing structure $&lt; 3 \text{ km}$</td>
</tr>
<tr>
<td>0.6</td>
</tr>
<tr>
<td>Unnamed major structure defined by aeromagnetics</td>
</tr>
<tr>
<td>0.6</td>
</tr>
<tr>
<td>Unknown/no information</td>
</tr>
<tr>
<td>0.5</td>
</tr>
<tr>
<td>Structure, but not favourable for gold</td>
</tr>
<tr>
<td>0.3</td>
</tr>
<tr>
<td>Evidence of no structure</td>
</tr>
<tr>
<td>0.3</td>
</tr>
<tr>
<td><strong>P3 Fluid</strong></td>
</tr>
<tr>
<td>Presence of near economic drill intercepts</td>
</tr>
<tr>
<td>0.9</td>
</tr>
<tr>
<td>Significant soil anomaly</td>
</tr>
<tr>
<td>0.7</td>
</tr>
<tr>
<td>Significant RAB anomaly</td>
</tr>
<tr>
<td>0.7</td>
</tr>
<tr>
<td>Moderate soil anomaly</td>
</tr>
<tr>
<td>0.6</td>
</tr>
<tr>
<td>Moderate RAB anomaly</td>
</tr>
<tr>
<td>0.6</td>
</tr>
<tr>
<td>Unknown/no information</td>
</tr>
<tr>
<td>0.5</td>
</tr>
<tr>
<td>No significant anomalies – target tested</td>
</tr>
<tr>
<td>0.2</td>
</tr>
<tr>
<td><strong>P4 Trap</strong></td>
</tr>
<tr>
<td>Within recognised local structures that host deposits</td>
</tr>
<tr>
<td>0.9</td>
</tr>
<tr>
<td>Within recognised local structures (favourable orientation w.r.t. regional structures)</td>
</tr>
<tr>
<td>0.8</td>
</tr>
<tr>
<td>Within second/third order structures, favourable</td>
</tr>
<tr>
<td>orientations</td>
</tr>
<tr>
<td>0.7</td>
</tr>
<tr>
<td>Evidence for disrupted stratigraphy through faults,</td>
</tr>
<tr>
<td>folding – within bend or dilational jog add 0.1 (to</td>
</tr>
<tr>
<td>above values)</td>
</tr>
<tr>
<td>0.6</td>
</tr>
<tr>
<td>Favourable lithology and/or rheology contrast</td>
</tr>
<tr>
<td>0.6 - 0.7</td>
</tr>
<tr>
<td>Unknown/no information</td>
</tr>
<tr>
<td>0.5</td>
</tr>
<tr>
<td>Lies outside second/third order structures</td>
</tr>
<tr>
<td>0.3 - 0.4</td>
</tr>
</tbody>
</table>
Metal Transaction Ratio (MTR)

- Valuation of properties with more than one metal in the mineral resources (polymetallic deposits)
- Metal Transaction Ratio (MTR) is the ratio of the transaction value to the gross in situ “dollar content” of all metals in the resource
- Gross in situ “dollar content” uses metal prices as of the transaction date
- Analogous to $ per unit metal expressed as % of metal price
Yardstick / Rule of Thumb Method

Under the yardstick method of valuation, specified percentages of the spot price is used to assess the likely value. Commonly used yardstick factors as applicable to gold are:

- Measured Resources - 2% to 5% of the spot price
- Indicated Resources - 1% to 2% of the spot price
- Inferred Resources - 0.5% to 1% of the spot price
- Exploration Targets - <0.5% of the spot price
Valuation of Mineral Resources

Use comparable properties for valuation:
- Same commodity, e.g. gold, uranium, copper
- Same political jurisdiction
- Similar geological setting
- Similar mineral deposit type
- Similar size and grade of resource
- Similar stage of exploration or development

Determine $/unit metal for market comparables:
- Analyse transaction terms to get property value
- Calculate units of metal in mineral resource estimate
- Calculate $ per unit metal, e.g. $/oz Au, $/lb U₃O₈ or $/lb Cu

Analyse $/unit metal values to determine an appropriate range of values for the subject property.
Valuation of Producing Assets

Most commonly used methods are:

- Discounted Cashflow (DCF)/ Net Present Value (NPV Model)
- Real Options
- Comparable Transactions
- Option Agreement Terms
Conclusion

- Investors have access to an array of public information.
- Inconsistent use of reporting definitions, supporting information/ project assumptions and outcomes may be confusing and even misleading.
- Confirming the correct project development context is essential for assessing the risk, opportunity, relative confidence and value associated with a resource project.
- Value of exploration and other non-producing mineral properties lies in their potential for hosting a viable mining operation.
Conclusion

• Comparable transactions method works reasonably well using properties similar to the subject property

• Technical experience and judgement is a critical requirement for valuation of non-producing mineral properties

• Mineral property asset value is but one component of the value of a mining company and the share price
SRK Key Personnel - Valuations

Jeames McKibben, BSc Hons, MBA, Chartered Valuation Surveyor (MRICS), MAusIMM(CP), MAIG – Principal Consultant
Jeames McKibben is an experienced international mining professional having operated in a variety of roles including consultant, project manager, geologist and analyst over more than 24 years. He has a strong record in mineral asset valuation, project due diligence, independent technical review and deposit evaluation. As a consultant, he specialises in mineral asset valuations and Independent Technical Reports for equity transactions and in support of project finance. Jeames has been responsible for multi-disciplinary teams covering precious metals, base metals, bulk commodities (ferrous and energy) and other minerals in Australia, Asia, Africa, North and South America and Europe. He has assisted numerous mineral companies, financial, accounting and legal institutions and has been actively involved in arbitration and litigation proceedings. Jeames is a current member of the VALMIN Committee.

Caue Araujo, BSc (Geology), MBA (Project Management & Finance), MAusIMM – Principal Consultant
Caue Araujo is an experienced mining professional with skills and experience encompassing geology, commercial leadership, mining finance and investment strategy, mineral economics, economic modelling and project management. Caue has participated in mining project evaluations and technical due diligence (Mergers & Acquisitions), and Mineral Resource/Ore Reserve audits (NI 43-101, JORC, VALMIN and US SEC). He has prepared independent technical reports, exploration valuations and global strategic geological exploration assessments across a range of geological environments and commodities. Most recently Caue held the roles of Global Iron Ore Industry Director at the Australian Mineral Economics Group (AME) and General Manager SRK Consulting Brazil. He has in-depth knowledge of technical and commercial aspects of the iron ore industry, and significant exposure to other base metal, precious metal and industrial mineral deposits in Australia, Brazil, Canada, Africa and Russia. Prior to consultancy, Caue gained experience in iron ore open pit grade control, brownfield exploration target generation, geologic 3D modelling, long-term planning and ISO quality internal audits while working for Vale S.A. in Brazil.

Steve Gemell, BE (Mining) (Hons), FAusIMM(CP), MAIME, MMICA – Corporate Associate Consultant
Steve Gemell is a professional mining engineer with over 40 years’ experience, having worked throughout Australasia and in North and South America, Africa, Asia, Europe and Oceania. He has been Principal of Gemell Mining Engineers, a multi-discipline consultancy, since its formation in Kalgoorlie in 1984. His experience includes operational management from shift boss to resident manager level, and supervision of open pit and underground mines, and CIP/CIL, flotation and alluvial processing plants. He has subsequently held executive and non-executive directorships, including the positions of CEO and Chairman, in numerous listed mining and exploration companies, and was for some years a Visiting Fellow at the University of New South Wales.
Anthony Stepcich, BEng (Mining), MSc (Mineral Economics), GDip (Finance & Investment), Dip (Technical Analysis), FAusIMM(CP) – Principal Consultant

Anthony Stepcich is a Mining Engineer with 22 years’ experience in the mining industry, having gained both underground and open-pit metalliferous experience, and open-pit coal experience. Anthony has postgraduate qualifications in finance and economics. He specialises in open-pit design and scheduling and project evaluations. Anthony is a Competent Person for the reporting of Ore Reserves in accordance with JORC Code (2012). Anthony is also an Expert in accordance with the VALMIN Code (2005) for the public reporting of valuations across multiple commodities. Anthony has experience working in Australia and Indonesia.

Karen Lloyd, BSc(Hons), MBA, FAusIMM – Associate Principal Consultant

Karen Lloyd has more than 20 years international resource industry experience gained with some of the major mining, consulting and investment houses globally. She specialises in Independent reporting, mineral asset valuation, project due diligence, and corporate advisory. Karen has worked in funds management and analysis for debt, mezzanine and equity financing and provides consulting and advisory in support of project finance. She has been responsible for multi-disciplinary teams covering precious metals, base metals, industrial minerals and bulk commodities in Australia, Asia, Africa, the Americas and Europe.