

## Ensuring Cost Effective, Safe and Quality Throughput ([www.lorenzenconsultants.com.au](http://www.lorenzenconsultants.com.au))

The Mining and Minerals industry is challenged by an unprecedented focus on productivity and cost efficiency and requires deep industry insights and experience to be able to survive in these times while still maintaining the social license to produce.

Commodity price

Demand for expert and specialist knowledge

Number of mining mergers & acquisition

With more than 32 years of international industry experience combined with global network, Dr Lorenzen offers resources industry best practise expertise in the areas of:

- Mineral & Metallurgical Processing;
- Due Diligence Studies
- Capital Project Development; and
- Environmental Issues

Specialising in various commodities including Gold, PGM's, BMS's, Iron Ore & Uranium

## Dr Leon Lorenzen

- “ 76 peer reviewed journal publications
- “ 3 book chapters
- “ 3 patents
- “ >250 presentations at international forums
- “ Professionally registered in various countries as Chartered and Professional Engineer
- “ Competent Engineer and Qualified Person
- “ Fellow of 6 professional bodies.

### Qualifications

- Engineering: – PhD (Metallurgical Eng)  
– MScEng (Metallurgical Eng)  
– BEng (Chemical Eng)
- Professional: – Executive Management Programme  
– AICD Board of Directors Graduate

### Professional Credentials

- CPEng (Australia), CEng (UK and Canada), PrEng (RSA)
- FAusIMM, FIEAust, FSAIMM, FIChemE, FSAICHe, FSAAE, GAICD



### Contact

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*Buy Knowledge Not Time*

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## Processing (working smarter)

- ❖ Cost reduction
- ❖ Throughput improvement
- ❖ Sustainable capital savings
- ❖ Better control & Higher yields
- ❖ Benchmarking & Research database
- ❖ Sampling and Laboratory procedures

*“The experience and alternative point of view Leon brought to the table was very valuable, highly professional and exceeding our expectations” Northern Star*

### Experience

- ❖ Jaguar (Jabiru Metals/Ind Group, Australia) – HMS Plant Expansion Review (Copper): 2011
- ❖ St Ives (Goldfields, Australia) – Reconciliation (Gold): 2013
- ❖ Mt Keith (BHP Billiton, Australia) – Comminution Review (Nickel): 2009&10
- ❖ Tropicana Mine (AngloGold Ashanti, Australia) (Gold): 2014/15/16
- ❖ Paulsen’s and Plutonic (Northern Star, Australia) – Plant Optimisation (Gold): 2014&15

## Capital Project Development

- ❖ Scoping, PFS, FS Studies
- ❖ PM and Process Expertise
- ❖ Cost effective Metallurgical Testwork Design
- ❖ Risk Management and Facilitation
- ❖ Process Design Criteria and Flowsheet Development
- ❖ Research

*“Dr Lorenzen provided, effective time efficient, accurate & technical sound results” Nord Gold*

### Experience

- ❖ Severstal/Nord Gold (Gross Gold Project – Russia): 2012 to 2013
- ❖ Roxgold (Yaramoka Gold Project – Burkina Faso): 2013 to 2015
- ❖ Excelsior (Kalgoorlie North Gold Project –Australia): 2014
- ❖ Phoenix (Castle Hill Gold Project – Australia): 2013 to 2014
- ❖ Hot Chili (Productora Copper Project – Chile): 2014 to 2015
- ❖ Capricorn (Karlawinda Gold Project – Australia): 2016
- ❖ Explaurum Ltd (Tampia Gold Project – Australia): 2016
- ❖ SEK/Tiger Resources (Kipoi Cobalt Project – DRC): 2016

## Risk and Environmental

- ❖ Cleaner Production & Waste Management
- ❖ Risk Workshops
- ❖ Responsible Design and Operations
- ❖ Implementation of Env Quality Systems (ISO)

*“Leon’s approach, efficiency & guidance was far exceeding all expectations” Rupert and Rothschild*

### Experience

- ❖ ISO 14001 and 18001 Implementation into 14 Wineries: 2005 to 2007
- ❖ Sasol One and Two – Use of Fly Ash to treat industrial waste streams: 2003 to 2008
- ❖ Galaxy (Australia and Argentina), Roxgold (Burkina Faso), Phoenix, Excelsior, BHP Billiton, Tropicana (Australia), Hot Chili (Chile) – Facilitate Risk Workshops: 2011 to 2016
- ❖ Rupert and Rothschild International (South Africa and France) – Dissolved Air Flotation Plant for Winery to treat effluent water streams: 2006

## Due Diligence , Reviews and Listings

- ❖ Independent Expert Opinion
- ❖ Confidence in technical assumptions made
- ❖ Benchmarking – similar operations/projects
- ❖ Competent and Qualified Person sign off

*“Very glad that Dr Lorenzen managed to turn around such a quality high level valuation report in such short time” Galaxy*

### Experience

- ❖ > 20 Confidential Due Diligence Reports (Gold, Platinum, Copper, Iron Ore, Coal, Potash and Uranium: 2000 to 2016)
- ❖ Galaxy Resources (Australia, China and Argentina) – Independent Engineer for Banks for the Jiangsu Lithium Carbonate Processing Plant (China) and for Mt Cattlin Spodumene Mine (Australia) as well as the Sal de Vida Lithium Project (Argentina): 2011 to 2013, High level valuation: 2015
- ❖ Papillon Resources (Worldwide) – DD of assets (Gold): 2014
- ❖ West African Resources – Mangarka 5 Gold Project NI43-101 (Author): 2015
- ❖ Royal Bafokeng Rasomine (South Africa) – DD and London and Johannesburg Listing of Technical Documents (Platinum): 2010
- ❖ Roxgold (West Africa) – Yaramoka NI43-101 (Author) (Gold): 2013&14
- ❖ Nord Gold (Russia) – Gross NI43-101 (Author) (Gold): 2012&13
- ❖ Hot Chili (Chile) – Productora (Copper and Moly) Author: 2015
- ❖ Monument – Selensing Mine NI43-101 – 2016

## Research and Innovation

- ❖ Manage and design research programmes
- ❖ Innovative research
- ❖ Publications and reports
- ❖ Presentations and workshops
- ❖ International forum

### Experience

- ❖ 3 Patents
- ❖ 76 Journal Publications
- ❖ >250 Conference Papers
- ❖ Major Research Groups University: 1990 to 2008
- ❖ Anglo American Research Laboratories: 1983 to 1987
- ❖ BHP Billiton Technology: 2008&09 and 2015–16
- ❖ Snowden Innovation Management: 2009 to 2013
- ❖ BHP Billiton Ltd (TGP&E) Innovation & Technology Scans: 2015&16

*“Dr Lorenzen was top rated international researcher in South Africa and Vice-Chancellor’s Award for Excellence in Research, Stellenbosch University (2002)”*

## Training and Continuous Development

- ❖ Workshops
- ❖ Keynote Presentations
- ❖ Course Development (Undergraduate, Post-graduate and continuous education)
- ❖ Course Presentation
- ❖ Mentorship of younger engineers as well as supervisor of post-graduate students

### Experience:

- ❖ Stellenbosch University: 1990 to 2008
- ❖ University of Melbourne: 1997
- ❖ University of Lyon: 2002 to 2008
- ❖ University of Cape Town: Various Courses
- ❖ Snowden: 2009 to 2013 – Various Courses
- ❖ Optiro: 2015 to 2016 – Mineral Processing
- ❖ Curtin University: 2015 – Sampling and Labs

*“Dr Lorenzen was the awarded the Medal for Researcher of the Year, Faculty of Engineering, Stellenbosch Lecturer of the Year, Faculty of Engineering, Stellenbosch University”*