

# JKTech Specialist Consulting

Delivering innovation to the global resources industry through a team of highly skilled experts with world-wide operational experience.



**JKTech Pty Ltd**  
[www.jktech.com.au](http://www.jktech.com.au)

***JKTech offers a range of consulting services from feasibility and exploration studies right through to recovery methods which aim to optimise a plant's working capacity, resulting in increased profits. Our team of expert consultants provides a strong technical partnership with our clients in which process improvements are realised.***

## **GEOMETALLURGICAL**

***JKTech has developed a GeoMet Modelling Pathway that leads companies and sites through a series of manageable iterative steps to increase orebody knowledge and reduce risk.***

Ultimately the pathway provides the potential to characterise operational performance at a similar scale and frequency to that of assays using laboratory scale tests. Such tests can be facilitated by JKTech or other providers with a number of options to suit the client and situation.

The goal of geometallurgy is the predictive quantification of processing performance variability of a deposit through the characterisation of fundamental rock properties and embodied within the block model. GeoMet Modelling will:

- Facilitate more effective process design, mine planning and optimisation
- Lead to improved forecasts
- Improve risk management and increase economic returns

## **MINING**

***JKTech offers practical solutions in mining using the cutting edge research outcomes developed by the Julius Kruttschnitt Mineral Research Centre (JKMRC) and the WH Bryan Mining and Geology Research Centre (BRC), who are recognised as the world leaders in the field of blasting, comminution and flotation research.***

### **Mine-to-Mill® Process Optimisation**

The Mine-to-Mill® concept, developed at the JK Centre, introduces an holistic approach to process optimisation by identifying and measuring the leverage that each process has on different downstream processes and then optimising the process chain to maximise the overall profitability, rather than optimising each sub process regardless of the downstream effect. Successful implementation of this methodology requires in depth knowledge of each key process in the mine to mill value chain and its interaction with the other downstream process. JKTech, with its world class mining and mineral processing team, uses this methodology to improve throughput and recovery from blasting through to flotation concentrates.

### **Dilution and Ore Loss Management**

The JKMRC and the BRC have developed tools to measure and model blast induced movement to predict ore loss and dilution. JKTech consultants use these tools to minimise blast induced dilution and ore loss.



## Open Cast Blast Optimisation

Open cast blast optimisation solutions also make use of the JKMRC/BRC tools to understand the effect of blasting on coal loss and coal fines, and then optimise blast design to increase overall profitability. This methodology has been successfully applied at several large open cast coal mines and resulted in significantly improved coal recoveries.

## Blast Audits and Optimisation

Blast audits assess the quality of blast design and implementation and provide an insight into problems in blast fragmentation, diggability and damage. The audit results combined with JKTech knowledge and tools provide practical solutions to improve the blasting process.

# PROCESSING

*JKTech has highly trained comminution and flotation specialists with experience in numerous process plants around the world. Our consultants have available to them state-of-the-art equipment, backed by years of research which has enabled JKTech to develop unique methodologies in the areas of comminution and flotation. Application of these methods will allow your operation to achieve optimum output in terms of throughput, grade and recovery.*

## Comminution

A typical optimisation study involves conducting detailed surveys followed by mass balancing and model fitting of the survey data to create a simulation model of the comminution plant in JKSimMet. The model is then used to assess and compare options for optimising plant operation. This methodology has been proven to effectively assess plant performance, improve throughput, increase energy efficiency and meet product specifications in comminution and classification circuits around the world.

A typical design study utilises a large database of machine specific parameters developed by JKTech to predict equipment size requirements, recirculating loads and other key operating parameters for the circuit.

## Flotation

JKTech can benchmark and optimise your flotation circuit performance through metal flotation optimisation studies involve a survey campaign including sampling, flotation cell characteristics measurements and batch flotation tests. The combination of these procedures enables JKSimFloat to simulate changes in circuit configuration and operating conditions, ultimately determining the optimum performance of the flotation process stage. For different ore types and blends, the JK Floatability Index is used to determine the floatability parameters, which are then used in JKSimFloat for benchmarking and optimisation studies.

A typical design study uses a database of typical machine parameters developed by JKTech for a wide range of flotation cell types and sizes. In conjunction with the JK Floatability Index test, the optimum circuit configuration and operating parameters for the ore types in question can be predicted.

JKTech has provided recommendations to optimise grade and recovery, leading to up to US\$25Million additional revenue reported at some operations.

## Processing Statistics

Minerals engineers are often required to do experiments and to analyse the results from those experiments. They may range from simple laboratory tests to major plant trials lasting several months and costing hundreds of thousands of dollars. In each case, data are collected to allow some decision(s) to be made. It is important to arrive at the right decision in the shortest possible time and at the lowest possible cost. This is often difficult to achieve because mineral processing data are usually imprecise and, especially in the case of plant data, subject to uncontrolled trends, cycles and variations, which make comparisons difficult.

JKTech specialists in mineral processing statistics will use the relevant statistical tools to assist you in making wise decisions in the face of uncertainty in the mineral processing environment. This includes statistical principles and methods needed to analyse laboratory experiments and plant trials to provide the correct result with the highest degree of confidence.

# MINERALOGY

*JKTech has a team of highly skilled experts in both applied and process mineralogy, to assist in understanding and predicting plant performance.*

## Process and Applied Mineralogy

Process mineralogy is a combination of the fields of mineralogy and metallurgy and plays an important role in all stages of mineral processing operations, with prediction and trouble-shooting being two major objectives. Applied mineralogy covers all mineralogical studies required during an exploration program and for other geological research programs. Process and applied mineralogy consulting services offered by JKTech include:

- Base metals
- Precious metals
- Mineral sands
- Industrial minerals
- Automated mineralogy
- Process mineralogy training
- Exploration mineralogy
- Genetic mineralogy
- Environment mineralogy
- Separation and concentration of minerals of interest
- Routine conventional and advanced instrumental analysis

# METALLURGICAL AND TECHNICAL SUPPORT

JKTech can provide metallurgical and technical support services to processing plants lacking on-site metallurgical guidance. The services available include:

- Assistance/mentoring
- Process troubleshooting
- Plant surveying
- Circuit modelling and simulation
- Liberation data analysis
- Laboratory metallurgical testwork
- Training courses

# SUSTAINABILITY

The unique relationship between JKTech and the Sustainable Minerals Institute enables JKTech to provide a holistic mine-life cycle service. In addition to integrated extraction consulting, JKTech offers consulting using cutting-edge research outcomes in the key sustainable areas of safety, water, environment and social responsibility:

- Safety and risk management – training, risk assessments, human factors in equipment design
- Water in mining – development of mine water systems, water balancing & accounting
- Social responsibility – social risk management systems, community surveys, conflict management
- Mined land rehabilitation – tracking trace elements, plant-life before and after mine operation



## BENEFITS OF WORKING WITH JKTECH

1. Access to cutting edge research and technology from the Centres of the Sustainable Minerals Institute (SMI).
2. A dedicated team of world class specialists, experts in their field, working to maximise the potential of each stage in your project lifecycle.
3. Innovative and proven techniques developed by leading industry experts.
4. Measurable increases in productivity and metal recovery, resulting in a more sustainable and profitable operation.
5. A global network of agents delivering JKTech products and services.

## About The Company

JKTech Pty Ltd is the technology transfer company for the Sustainable Minerals Institute (SMI) at The University of Queensland. Its role is to take viable research outcomes and transfer them to the international minerals industry.

JKTech offers a range of innovative solutions for the minerals industry aimed at optimising sustainability, increasing productivity and metal recovery and reducing operating costs. These specialist products and services include consulting, software, equipment, laboratory services and knowledge transfer.



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**SMI JKMR**C

Julius Kruttschnitt Mineral  
Research Centre

**SMI BRC**

WH Bryan Mining &  
Geology Research Centre

**SMI CMLR**

Centre for Mined Land  
Rehabilitation

**SMI MISHC**

Minerals Industry Safety  
& Health Centre

**SMI CSR**M

Centre for Social  
Responsibility in Mining

**SMI CWiMI**

Centre for Water in the  
Minerals Industry

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## FURTHER INFORMATION ON CONSULTING SERVICES

*The JKTech Specialist Consulting Services group is comprised of highly skilled experts with world-wide experience in various fields.*

For more detailed information on JKTech's entire range of consulting services, please visit the JKTech website, [www.jktech.com.au](http://www.jktech.com.au), or contact:

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### JKTech Services

JKTech's extended range of technologies and products, all supported by the ongoing research activities of the Sustainable Minerals Institute at The University of Queensland, include:

- Consulting (comminution, flotation, mineralogy, mining and geometallurgy, Mine to Mill®)
- Process mineralogy and in-house mineralogical analysis
- Specialist Software (JKSimMet, JKSimFloat, JKMultiBal, JKSimBlast)
- Specialist Equipment (JKRBT, JK Drop Weight Tester, flotation characterisation equipment)
- Metallurgical Laboratory Services
- Knowledge Transfer (professional development, training courses, workshops)

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