

**Saturday & Sunday, February 18-19, 2012**  
**Washington State Convention Center**

## *Copper Heap Leach*

**Member: \$495 • Nonmember: \$595**  
**Student Member: \$350**

### **Overview:**

The proposed Copper Heap Leach course is the continuation of the Copper Heap Leach short course taught for ten years beginning in 1990 at the SME annual meeting. The course is designed to provide the attendees with a comprehensive understanding of the technology and economics of copper heap leaching. It focuses on the basic principles that underpin the design and implement metallurgical testing programs, the interpret the test results, and the use of the results to design, construct, and operate successful copper heap leach operations. The course will cover the following specific aspects of copper heap leaching: 1) the history of copper leaching and solvent extraction electrowinning of copper, 2) the design and implementation of metallurgical testing programs and the interpretation of test results, 3) the chemistry of copper leaching, the interaction of the leach solutions with specific minerals in the ore, and the importance of quantifying the ore/gangue mineralogy, 4) solvent extraction of metals, 5) The geotechnical aspects of copper heap leaching, including water balance issues and the design and construction of pads and ponds, 6) the design of SX/EW plants, and 7) the dissection of one or more failed copper heap leach operations. The course will include a course summary with a question and answer period. The course is designed for technical and non-technical participants who wish to understand the technology and economics of copper heap leaching and for people involved in copper heap leach projects and operations, who wish to up-grade their understanding of the technology or of certain technological issues. The course does not require engineering or geological training but it presupposes a background in basic science and a familiarity with general mining and mineral processing terminology. Many past successful past participants have had backgrounds in finance, management and government oversight.

### **Content by Day:**

#### **Day 1:**

- Introduction and Course Overview
- Overview of Copper Heap Leaching
- The Chemistry of Copper Leaching
- Commercial Ore Testing
- Solvent Extraction of Metals

#### **Day 2:**

- Pad and Pond Lay-Out and Site Investigation
- Water Balance and Liner Design
- Ore Testing Case History
- Evaluation of a Failed Operation
- Discussion and Recap

### **Instructors:**

**Joseph M. Keane;**  
K D Engineering  
520-579-8315  
jkeane@kdengco.com

**Gary Kordosky, Ph. D.**  
520-743-0677

**John E. Dreier Ph.D**  
303-278-4445  
jedreiergeo@comcast.net

**Paul Thompson**  
Jacobs Engineering  
Phone: 520.917.5500

**David Kidd**  
Golder Associates  
520-888-8818

**Saturday & Sunday, February 18-19, 2012**  
**Washington State Convention Center**

## *Mine to Mill Process Optimization*

**Member: \$495 • Nonmember: \$595**  
**Student Member: \$350**

### **Overview:**

Mining and processing operations involve a variety of steps, each with their own attributes and requirements for efficiency. However, in some cases the conditions required to optimise any one of these steps may be counterproductive for the achievement of optimisation in another. An approach is therefore warranted in which conditions for each step are varied so as to achieve global optimisation.

The Julius Kruttschnitt Mineral Research Centre at the University of Queensland has been involved in implementing such a holistic methodology "Mine to Mill Process Optimisation" to maximise the overall profitability of mining operations. The objective of this methodology is to develop and implement site-specific mining and milling strategies to maximise the operations profitability in a sustainable manner.

This course explains the methodology and discusses in detail the critical aspects to successfully implement it in a sustainable manner. Benefits of such an approach on the energy consumption, green house

gas emissions and the overall costs and benefits of an operation will be explained using case studies.

The objective of this course is to increase the awareness and communication between mining engineers and metallurgists to work collaboratively to improve the overall profitability of their operations. This course is aimed for drill and blast engineers, mine superintendants, metallurgists, plan superintendants, mine managers, concentrator managers, general managers, asset optimization managers and business improvement managers - personnel responsible to improve the overall productivity of operations.

## **Content by Day:**

### **Day One**

- Outline of Course / Introductions
- Mine-mill philosophy
- Drilling and blasting – impact on downstream operations
- Coffee Break
- Introduction to crushing and grinding
- Introduction to flotation and other separation processes
- Lunch
- Rock breakage during M2M processes
- Coffee Break
- Rock characterisation for M2M purposes
- Discussions

### **Day Two**

- Drill and blast process audit
- Mill surveys
- Coffee Break
- Blast modelling
- Plant modelling
- Lunch
- Integration of models and simulations
- Coffee break
- Implementation of Mine-to-Mill® projects
- Discussions

## **Instructors:**

**Dr. Sarma S Kanchibotla**

**Dr. Sebastian Tello**

JKTech Pty Ltd  
Brisbane – QLD AUSTRALIA

T - +61733655842

F - +61733655900

[www.jktech.com.au](http://www.jktech.com.au)

**Saturday & Sunday, February 18-19, 2012**

**Washington State Convention Center**

## ***Techniques for Model Building in Strategic Mine Schedule Optimization***

**Member: \$595 • Nonmember: \$695**

**Student Member: \$450**

## **Overview:**

Strategic mine planning has risen in prominence in recently years. However the strategic mine planning process is not well-defined across the industry. Different approaches to strategic mine planning can lead to widely varying results for a given project or operation. The skill and expertise level required for value-adding strategic mine planning is not addressed within typical undergraduate mining education programs.

This short course is designed to give people involved in creating or reviewing strategic mine schedules an understanding of schedule model building that delivers optimal value to an organization. After completing the short course the attendee will be equipped with knowledge for building strategic mine schedule optimization models appropriate to their business and operational requirements. Attendees should have basic knowledge in open pit mining and ideally have some exposure to any aspect of mine planning. Computers will be supplied to participants for working through the examples.

## **Content by day:**

### **Day One**

- Context of Strategic Schedule Optimization in Mine Planning Process
- Deciding What to Model
- What to Optimize?
- Scheduling approaches
- A constrained process based approach to strategic schedule optimization
- Process-Based Modelling
- Advanced Process-Based Modelling

### **Day Two**

- Mining Logic
- Capital Expenditure
- Stockpiles
- Block aggregation
- Translating a block model to a strategic scheduling model
- Schedule results analysis
- Beyond Strategic Scheduling

## **Instructors:**

**Jim Butler,**

CEO, Minemax

[Jim.Butler@minemax.com](mailto:Jim.Butler@minemax.com)

**Richard Brownbill**

Technical Services Manager, Minemax

[Richard.Brownbill@minemax.com](mailto:Richard.Brownbill@minemax.com)

**Saturday & Sunday, February 18-19, 2012**  
**Washington State Convention Center**

## ***Truck-Shovel Simulation***

**Member: \$495 • Nonmember: \$595**  
**Student Member: \$350**

### **Overview:**

Simulation can be used to evaluate changes to existing truck-shovel systems or new systems. Discrete event simulation provides a means to model truck-shovel systems to evaluate performance. The advantage of this approach over others is the ability to evaluate uncertainty. This course will introduce participants to discrete event simulation and truckshovel simulation using Arena® in a hands-on way – drag and drop user interface no coding is required! Each participant will build a basic truck-shovel model. The course will also illustrate several sample models and the kinds of analysis, and results, that can be done with these models. All participants will have a CD of the demo version Arena®.

### **On completion of this course attendees will:**

- Understand the basic principles and methodologies, of discrete event simulation.
- Be introduced to the basics of using Arena Simulation Software (Rockwell Automation) as the simulation modeling tool.
- Be able to model and calculate the fleet productivity of a multi-shovel, multidestination, and multi-truck mining system.
- Be able to assess the uncertainty associated with the fleet productivity, haulage costs, and cash flow analysis to support decision making.
- Be able to assess the reliability of the mining fleet incorporating historical data such as cycle times, scheduled maintenance, shift change, mean time between repairs (MTBR), mean time between failures (MTBF), etc.

### **Course audience:**

- Anyone interested in learning the basics of Discrete Event Simulation can attend.
- However, the course is designed for engineers.

### **Background registrant should have to successfully participate in the course:**

- Basic knowledge of using Windows programs with Graphical User Interfaces

### **Content by day:**

#### **Day One**

- Underlying Ideas and Methods in Simulation
- Pieces Of a Simulation Model (Entities, Attributes, ...)
- Simulation Dynamics
- Simulation Clock Variable
- Simulation by Hand
- Simulation with Spreadsheet
- Fundamentals, A Guided Tour through Arena
- Starting Arena
- Load, Explore, Run an Existing Model
- Browse Dialogs and Menus
- Run Model and Look at Results
- Construct Simple Models From Scratch
- Tour Menus, Toolbars, Drawing, Printing
- Help System
- Creating and Disposing of Entities, Defining Variables and Attributes
- Using Basic Process Modules I
- Entity Flow and Attributes
- Capacity Constraining (Resources)
- Queues
- Arena Constructs
- Create Logic Module
- Process Logic Module
- Dispose Logic Module
- Entity Spreadsheet Module
- Resource Spreadsheet Module

#### **Day Two**

- Labs

### **Instructors:**

**Hooman Askari-Nasab, Ph.D., P.Eng.**

School of Mining and Petroleum Engineering  
Department of Civil & Environmental Engineering  
Phone: (780) 492 4053  
Email: hooman@ualberta.ca

**Kwame Awuah-Offei, PhD**

Mining & Nuclear Engineering Department  
Missouri University of Science & Technology  
Phone: (573)341-6438  
E-mail: kwamea@mst.edu

**Sunday, February 19, 2012**  
**Washington State Convention Center**

## ***Water Management***

**Member: \$395 • Nonmember: \$495**  
**Student Member: \$250**

### **Overview:**

Water is a fundamental consideration for mining and mineral processing operations. The supply, management and disposal of water are becoming increasingly important, particularly in Australia.

Understanding of the variability of quantity, quality and management of water resources is critical for meeting the water resource management challenges present in many operations.

Participants in this course will gain an understanding of water requirements (consumption and quality) across an operating mine, be able to analyze existing water infrastructure and contribute to the improvement of water management on a mine site or mineral processing plant.

The course is designed for people in the resource sector or those with aspirations to enter this booming industry. The course assumes no prior knowledge and is appropriate for mining executives, project managers, geologist, senior mine and processing plant operating staff, engineers and researchers. The course can also benefit training providers, suppliers to resource industry, technologist, accountants, brokers and investors.

### **Course content:**

- Introduction
- Water Treatment
- Water Management & the Environment
- Water Recovery
- Waste Water Treatment
- Unit Operations Issues
- New Technologies & Case Studies
- Industry Sectors & Strategies

### **Instructor:**

#### **Damian Connelly**

Director/Principal Consulting Engineer

Damian.Connelly@mets.net.au

Phone (+61 8) 9421 9000