

# Agenda: AMD Training Workshop



## **AGENDA : WORKSHOP ON GEOCHEMISTRY, WATER QUALITY AND MANAGEMENT ASSOCIATED WITH AMD**

### **Day 1: Water quality and mine waste geochemistry**

- Introduction
  - Workshop overview
  - Why bother understanding mine geochemistry and water quality?
- Acid, Metalliferous and Saline Drainage
  - What is AMD?
  - Reaction basics
  - Reactants needed (what's in the recipe)
  - Acid neutralisation reactions
  - Mine Site mineral reactions and implications
  - Acid vs Neutral – end of the story?
- “So what?” - impacts of acidity/neutralisation
  - pH
  - Metal solubility
  - Salinity
  - Mine Site contaminants of concern
- Source – pathway –receptor : Conceptual models
  - Conceptual models
  - Water as the common link
  - Mine water concepts
- Prediction of AMD/NMD/SMD
  - General principles
  - Acid base accounting
    - Mine Site context
  - Other static geochemical tests
    - Applications , Advantages and limitations
  - Interpreting static tests
    - Examples and discussions
  - Kinetic geochemical testing
    - Methods
    - Advantages and limitations of each
    - Interpretation
    - Examples and discussions
- Open discussion and Questions and Answers

## Day 2: Predicting and managing mine water quality

- Day 1 review
- Predicting mine water quality
  - Conceptual models revisited
  - Mine water hydrology
  - Mine water quality modelling
- Modeling aims and objectives
- Model types
  - Conceptual
  - Water Balance
  - Groundwater flow
  - Site water balance
  - Integrating flow and water quality
  - Reaction models
  - Reactive transport
- Considerations for predicting flow and water quality
  - Waste rock
  - Tailings
  - Groundwater
  - Site-wide (source terms in site context)
  - Operations/ Closure
- Case study applications
- Preventing, managing and mitigating AMD and mine water
  - Prevention
  - Management
  - Mitigation
- Highlights from approaches that have worked for different mine sites
  - Case examples
- Open discussion and Questions and Answers

## Presenters:

### **Brent Usher, PhD, PrSci Nat – Associate, Senior Hydrogeochemist,**

Brent has 19 years of experience in the field of mining geochemistry, aqueous geochemistry and hydrogeology. The work comprises the following technical strands:

- Whole Rock Geochemistry, Aqueous Geochemistry, Groundwater – aquifer conceptualization and assessment, Contaminant Hydrogeology, Mine Closure Planning.

Brent has undertaken technical assessments on over 120 mines in five continents. He has led and undertaken hydrogeochemical and hydrogeological assessments (conceptualisation and modelling) for mining projects across the world including metal, coal and diamond mining. Brent has been involved with the development and reviews of several acid mine drainage guidance documents and is one of two technical specialists on the South African Best Practice Guidelines for Prediction of Mine Water Quality. He was also technical lead for Klohn Crippen Berger's Gold Award in the Water category from Consult Australia in 2010. He has a firm understanding of several applicable software packages, as well as various groundwater and geochemical modelling packages.

Brent has co-authored 15 peer - reviewed scientific papers in journals and books, co-edited a book collection of peer-reviewed technical papers and produced over 40 conference outputs at international conferences.

### **Chris Langton – PGeo, Principal, Manager KCB Brisbane**

Chris has over 25 years of groundwater and environmental project experience in the mining, oil and gas and infrastructure sectors.

As a consultant, he has managed multi-disciplinary teams for mining feasibility, detailed design studies and closure, and has been involved in due diligence assessments for mining and financial institutions.

Chris has designed dewatering, depressurization and seepage management systems for open pit and underground mines for open cut and underground coal, oil sands and metal mines. He has provided water and waste management advice to mines in Australia, Africa, Asia and North America.

Chris has led groundwater environmental impact assessments from baseline studies and stakeholder consultations, through impact assessment and modelling, to permitting and operating compliance and for closure assessments and closure designs.