

FINAL PROGRAMME

First International Seminar on Environmental Issues in the Mining Industry
30 September – 2 October, Sheraton Santiago Hotel and Convention Center

WEDNESDAY, 30 SEPTEMBER

- 16:00-20:00** Registration
- 18:00-18:30** Authors & Session Chairs Coordination Meeting
- 19:00-20:00** **Inauguration Ceremony**
 Opening Words. Jacques Wiertz, Enviromine 2009 Technical Coordinator, Universidad de Chile.
 Welcome Address. Igor Gonzales, Enviromine 2009 Chairman, Barrick South America
 Keynote Lecture. **Corporate Environmental Responsibility**. Bill Williams, VP Environment, Barrick Gold Corporation, Canada.
- 20:00-21:30** Welcome Reception

THURSDAY, 1 OCTOBER

- 08:20-08:30** Updates and Announcements
- 08:30-10:00** **PLENARY SESSION 1**
 Chair: Chris Moran, Sustainable Minerals Institute, The University of Queensland, Australia
- 08:30-09:00** **Practical Applications of Environmental Ore Deposit Models in Mine Development with a SEDEX Example**
 Y.T. John Kwong, CANMET Mining and Mineral Science Laboratory, Canada
- 09:00-09:30** **Stable, Inert and Contained: Mine Waste Disposal and the Sustainable Development Agenda**
Daniel Franks, Centre for Social Responsibility in Mining, SMI, The University of Queensland, Australia; David Boger, The University of Melbourne, Australia; Claire Côte, Centre for Water in the Minerals Industry, SMI, The University of Queensland, Australia; and David Mulligan, Centre for Mined Land Rehabilitation, SMI, The University of Queensland, Australia
- 09:30-10:00** **Dust Management – An Integrated Approach for the 21st Century**
 Jon Harper, SKM, Australia
- 10:00-10:50** Poster session and coffee break

SESSION 1: SUSTAINABILITY – ENVIRONMENTAL DESIGN

Chair: Y.T. John Kwong, CANMET Mining and Mineral Science Laboratory, Canada.

- 10:50-11:10** **Environmental Design Criteria: An Increasingly Required Engineering Deliverable**
 Jorge Arruete, Hatch Environmental and Community Interface, Chile

- 11:10-11:30 Environmental Bonding in Mining – Comparative Analysis of Regulatory Requirements**
Richard Poulin and Michel Jacques, Laval University, Canada
- 11:30-11:50 Mining and Biodiversity: San Guillermo Biosphere Reserve Management Plan, San Juan, Argentina**
Carlos Pujadas, Andrés Abelin, Javier Cerino, Emilio Pósleman, Isabel Rueda and María B. Vera, Institute for Sustainable Development, Universidad Católica de Cuyo, Argentina
- 11:50-12:10 GolderSET©: Application of a Sustainability Decision Support Tool to the Mining Industry**
Benoit Bourque, Robert Noël-de-Tilly and Pierre Groleau, Golder Associates, Canada
- 12:10-12:30** Questions/discussion
- 12:30-14:00** Lunch

SESSION 2: SUSTAINABLE WATER MANAGEMENT

Chair: Raymond Philippe, Hatch Water, Chile

- 10:50-11:10 Addressing the Potential Effects of Mine Dewatering on Terrestrial Groundwater Dependent Ecosystems – Pilbara Region, Western Australia**
Paul Howe and Jodie Pritchard, SKM, Australia; Jenny Carter, ENSIS CSIRO, Australia; Chris New, Rio Tinto Iron Ore, Australia
- 11:10-11:30 High Andean Vegas Management**
 José Luis Fornés, Barrick, Argentina
- 11:30-11:50 Tools to Calculate Groundwater Inflow to Underground Mines – A Comparative Assessment**
Jan Van Hooydonck, Artois Consulting, Chile; Mauro Prado and Nilson Guiguer, Schlumberger Water Services, Brazil; Cristian Bittencourt, Votorantim Metais, Brazil
- 11:50-12:10 Predicting Infiltration in Arid Environments**
Björn Weeks and Fernando Junqueira, Golder Associates, Chile/Canada; G. Ward Wilson, University of British Columbia, Canada
- 12:10-12:30** Questions/discussion
- 12:30-14:00** Lunch

SESSION 3: RISK ASSESSMENT

Chair: Nicole Porcile, Antofagasta Minerals, Chile

- 14:00-14:20 Environmental Impact and Toxicology of Sulphate**
 Patricio Moreno, Universidad Diego Portales, Chile; Hal Aral and Angelica Vecchio-Sadus, CSIRO Minerals, Australia
- 14:20-14:40 Determining Risks and Remediation Alternatives for the Abandoned Las Cascadas Plant: CODELCO División Salvador and SERNAGEOMIN Project**
 Cecilia Adasme, SERNAGEOMIN; Ernesto Ortiz, Codelco Salvador, Chile

- 14:40-15:00** **Statistical Techniques for Differentiating Sources of Arsenic at a Former Iron Mine, USA**
Julie Sueker and Gregory Albright, Arcadis, Inc, USA; Brian Bussa, Ford Motor Company, USA; Raul Víctor, Arcadis Geotécnica, Chile
- 15:00-15:20** **The Human and Ecological Risk Assessment Process as a Decision-Making Tool for Mining Sites**
Anne Thatcher and Margaret Bartee, Arcadis Inc, USA; Alexandra Belaunde, Esteban Briones and May-Lin Almendras, Arcadis, Chile; Claudia Arancibia and Ernesto Ortiz, Codelco Salvador, Chile
- 15:20-15:40** Questions/discussion
- 15:40-16:10** Coffee break

SESSION 4: SUSTAINABLE WATER MANAGEMENT (CONTINUED)

Chair: Björn Weeks, Golder Associates, Chile

- 14:00-14:20** **Development of a Conceptual Hydrogeological Model of South Australia's Stuart Shelf**
Blair Douglas, Olympic Dam BHP Billiton, Australia; Paul Howe, SKM, Australia
- 14:20-14:40** **Pit Lake Modelling for the Athabasca Oil Sands Region, Alberta, Canada**
Nicolas Lauzon, Jerry Vandenberg and Ian Mackenzie, Golder Associates, Canada
- 14:40-15:00** **Groundwater Remediation Programme – La Coipa Mine, Minera Mantos de Oro, III Region, Northern Chile**
Erling Villalobos, Mantos de Oro Mining Company, Chile; Rowan McKittrick, Water Management Consultants, Chile
- 15:00-15:20** **Hydrogeochemical Evolution of an Uncapped Gold Tailings Storage Facility**
Mansour Edraki, Warwick Fegan, Thomas Baumgartl, Andrew Fletcher and David Mulligan, Centre for Mined Land Rehabilitation, Sustainable Minerals Institute, The University of Queensland, Australia; Ali Munawar, Gadjah Mada University, Indonesia
- 15:20-15:40** Questions/discussion.
- 15:40-16:10** Coffee break

SPECIAL SESSION: SOCIAL ISSUES DISCUSSION FORUM

Chair: Jacques Wiertz, Universidad de Chile

Discussion leader: Daniel Franks, SMI, The University of Queensland

- 16:10-16:30** **Keynote Address:**
Avoiding Mine - Community Conflict: From Dialogue to Shared Futures
Daniel Franks, Centre for Social Responsibility in Mining, Sustainable Minerals Institute, The University of Queensland, Australia
- 16:30-16:50** **Keynote Address:**
Environmental Impact Assessment in Chile: The Growing Complexity of Including Social and Community Elements
Gabriel Aránguiz, Arcadis, Chile

- 16:50-17:00** **Panel Presentation: Perception of Women in the Mining and Minerals Exploration Industries, A Canadian Perspective**
Mafalda Arias and Barbara Caelles, Women in Mining International Organisation, Canada
- 17:00-17:10** **Panel Presentation: Companies and the Communities: Building an Alliance to Ensure Sustainable Development**
Rebecca Sanhueza, Xstrata Copper, Chile
- 17:10-17:20** **Panel Presentation: Stakeholder Engagement and Social Sustainability in the Mining Sector**
Björn Weeks, Golder Associates, Chile.
- 17:20-18:30** Open discussion
- 19:30-22:30** Reception and Seminar Welcome Dinner. *Courtesy of Barrick South America.*
End of day 2.

FRIDAY, 2 OCTOBER

- 08:20-08:30** Updates and Announcements
- 08:30-10:00** **PLENARY SESSION 2**
Chair: Jacques Wiertz, Universidad de Chile
- 08:30-09:00** **Integrating Environmental Management into Mines of the Future**
Chris Moran, Sustainable Minerals Institute, The University of Queensland, Australia
- 09:00-09:30** **Addressing Uncertainties in Water Quality Modelling for Environmental Impact Assessment**
Nicolas Lauzon and Ian Mackenzie, Golder Associates, Canada
- 09:30-10:00** **Automatic Irrigation System at Jachucoposa Spring for the Mitigation of Impacts Due to Water Extraction**
Oscar Zepeda, Doña Inés de Collahuasi Mining Company, Chile; Jack Stern, Jack Stern & Cia Ltda., Chile; Tomás Rioseco, Centro de Ecología Aplicada, Chile
- 10:00-10:50** Poster session and coffee break
- SESSION 5: BEST ENVIRONMENTAL PRACTICES**
Chair: David Mulligan, Centre for Mined Land Rehabilitation, SMI, The University of Queensland, Australia
- 10:50-11:10** **PDAC's e3 Plus — A Framework for Responsible Exploration: Principles and Guidelines**
Bernarda Elizalde, Tony Andrews and Brenda Dalglish, Prospectors and Developers Association of Canada (PDAC), Canada
- 11:10-11:30** **How to Meet the Challenge of Tailings Filtration**
Rainer Raberger and Gernot Krammer Andriz, Austria

11:30-11:50 Urban Artisanal Gold Shops and Mercury Emmissions Control in Andacollo, Northern Chile
Paul Cordy and Marcello Veiga, University of British Columbia, Canada; Daniel Moraga, Universidad Católica del Norte, Chile; Daniel Stapper and Kevin Telmer, University of Victoria, Canada

11:50-12:10 Best Practices and Efficient Water Use in the Chilean Mining Industry
Rossana Brantes, Cochilco, Chile

12:10-12:30 Questions/discussion.

12:30-14:00 Lunch

SESSION 6: REMEDIATION AND REHABILITATION

Chair: Sara Pimentel, COCHILCO, Chile

10:50-11:10 Options for Management and Closure of Large Tailings Dams
Trina Jensen, Jodie Pritchard and David Welsh, SKM, Australia

11:10-11:30 Rehabilitation Options for Soils Affected by Oilfield Brine in an Arid Landscape
Andrew Fletcher, Thomas Baumgartl, Mansour Edraki, Rachel Kirchner and David Mulligan, Centre for Mined Land Rehabilitation, The University of Queensland, Australia; Nick Dunstan, Beach Petroleum Ltd., Australia

11:30-11:50 Functions of Designed Cover Systems in Semi-Arid Environments of Australia
Thomas Baumgartl and David Mulligan, Centre for Mined Land Rehabilitation, The University of Queensland, Australia

11:50-12:10 Waste Rock Test Panel Monitoring Installation
Edwin Zegarra, Barrick Misquichilca, Peru

12:10-12:30 Questions/discussion.

12:30-14:00 Lunch

SESSION 7: EFFLUENT TREATMENT

Chair: Nicolas Lauzon, Golder Associates, Canada

14:00-14:20 Sulphate Removal from Mining Effluents: An Overview of Current Developments in the Southern Hemisphere
Raymond Philippe, Hatch, Chile; Deon Nel, Hatch, South Africa; Trevor Clarke, Hatch, Australia

14:20-14:40 A Review of Acid Rock Drainage Sulphate Treatment Methods
Jason Rushing, John Koon and Dennis Tucker, Malcolm Pirnie Inc., USA

14:40-15:00 Green Technologies for Sulphate and Metal Removal in Mining and Metallurgical Effluents
Oscar Lopez, Bioteq Water, Chile; Mike Bratty, David Sanguinetti and David Kratochvil, Bioteq Environmental Technologies, Canada

15:00-15:20 Sulphuric Acid Recovery from Aqueous Waste Streams

Hal Aral, CSIRO Minerals, Australia. Jianhua Zhang, Stephen R. Gray and Marlene Cran, Victoria University, Australia

15:20-15:40 Questions/discussion.

15:40-16:10 Coffee break

SESSION 8: IMPACT ASSESSMENT AND FORECASTING

Chair: Raul Victor, Arcadis, Chile

14:00-14:20 **Achieving Corporate Sustainability Outcomes within a Mining EIA Framework**

Hjalmar Philipp and David Welsh, SKM, Australia

14:20-14:40 **The Chilean Copper Mining Sector: Energy Consumption and Greenhouse Gas Emissions Profile (2001 – 2007)**

Sara Pimentel, Cochilco, Chile

14:40-15:00 **The Flotation Behaviour of Arsenic-Bearing Minerals in Nickel Sulphide Flotation Systems**

Leanne Smith, Warren Bruckard and Kevin Davey, CSIRO Minerals, Australia

15:00-15:20 **Air Quality Modelling at Cerrejón Coal**

Sergio Petro, Carbones del Cerrejon, Colombia

15:20-15:40 Questions/discussion.

15:40-16:10 Coffee Break

SESSION 9: EFFLUENT TREATMENT (CONTINUED)

Chair: Paul Howe, SKM, Australia

16:10-16:30 **Clean Oxidants for Effluent Treatment in the Andean Mining Industry**

Luiz Teixeira, Catholic University of Rio de Janeiro, Brazil; Cristian Marquez, Innova Andina; Ulisses da Silva, Solvay, Brazil; Oscar Hernandez, Sun S.A., Brazil

16:30-16:50 **Acid Drainage Decontamination, The Andina Division Case Study**

Eduardo Astorga, Andina Division Codelco, Chile

16:50-17:10 **A Pilot Case Study for Passive Water Treatment at the El Indio Mine, Chile**

Guillermo Aguirre and Troy Jones, Golder Associates, Chile; Marcelo Robledo, Barrick, Chile

17:10-17:30 **Zeotreat: Multifunctional Adsorbents for Metal and Sulphate Removal in Mining Wastewaters**

Cecilia Vidal, Ulrike Broschek, Luis Bravo and Gilda Zuñiga, Fundación Chile

17:30-17:50 Questions /discussion

SESSION 10: IMPACT ASSESSMENT AND FORECASTING (CONTINUED)

Chair: David Welsh, SKMinmetal, Chile

16:10-16:30 **The Development of a Diagnostic Protocol for the Assessment and Testing of Sulphide Tailings**

David McCallum and Warren Bruckard, CSIRO Minerals, Australia

- 16:30-16:50 Bayóvar Project: First Non-Metallic Mining Project EIA for Phosphate Recovery in South America**
Martha Ly, Aldo León and Jorge Chávez, Golder Associates, Peru; Jose Luis Vega, Compania Minera Miski Mayo, Peru
- 16:50-17:10 Mineralogical Characterisation Techniques for Predicting Acid Rock Drainage**
Anita Parbhakar, University of Tasmania, Australia; Mansour Edraki, Centre for Mined Land Rehabilitation, SMI, The University of Queensland, Australia; Dee Bradshaw and Stephen Walters, Julius Kruttschnitt Mineral Research Centre, SMI, The University of Queensland, Australia
- 17:10-17:30** Questions /discussion
- 18:00-19:30** Farewell reception
- End of Seminar.

POSTERS

Passive Biological Treatment of Mine Water Using Constructed Wetlands

André Gerth, Anja Hebner and Alexander Litwinenko, Bioplanta GmbH, Germany

Treatment of Effluents Containing Cyanide – How to Choose amongst Hydrogen Peroxide, Metabisulphite + Air, or Caro's Acid

Luiz Teixeira, Catholic University of Rio de Janeiro, Brazil; Cristian Marquez, Innova Andina; Ulisses da Silva, Solvay, Brazil

Acid Rock Drainage Probability in "El Pachon" Deposit, San Juan, Argentina

Graciela Illanes, Marcelo Bellini and Marta Muñoz, Universidad Nacional de San Juan, Argentina

The Environmental Variable in the Mining Industry

Jorge Troncoso, AMEC, Chile

Evaluation of a Biological Alternative for the Removal and Stabilisation of Dissolved Mercury and Cyanide from La Coipa Mine Process Solutions

Marcela Muñoz, Marco Alfaro, Juan Rivadeneira and Rory Tibbals, Kinross Gold Corporation, Chile.

Implementation and Testing of Phytotechnologies in an Abandoned Mining Silt (Antofagasta, Chile)

E. Lam, E. Veloso and R. González, Universidad Católica del Norte, Chile; I. Montofré, Enaex, Chile.

Two Major Minesites to Compare the Performance of the Non-Traditional Dust Suppressant to a Water Only Program

Lynn Edwards, Midwest Industrial Supply, USA; James Stewart, Asarco Mine, USA

Sustainable Water Supply for Mining Projects

Paula Guerra and Sergio González, Hatch Water Latin America, Chile

The Tensor Function of the Hydraulic Conductivity – A Beneficial Possibility to Predict Water Fluxes and Mass Transport in Waste Deposit Capping Systems

Rainer Horn, Institute for Plant Nutrition and Soil Science, CAU Kiel, Germany; Thomas Baumgartl and David Mulligan, The University of Queensland, Centre for Mined Land Rehabilitation, Australia; José Doerner, Instituto de Ingeniería Agraria y Suelos, Universidad Austral de Chile, Chile.

The Challenges of Managing the Social-Environmental Impacts in Mining

Gabriel Aránguiz, Ilona Nuñez, Ricardo Ibarra and Vilma Pérez, Arcadis, Chile

Perception of Women in the Mining and Minerals Exploration Industries, A Canadian Perspective

Mafalda Arias and Barbara Caelles, Women in Mining International Organisation, Canada

The Human and Ecological Risk Assessment Process as a Decision-Making Tool for Mining Sites

Anne Thatcher and Margaret Bartee, Arcadis Inc, USA; Alexandra Belaunde, [Esteban Briones](#) and [May-Lin Almendras](#), Arcadis, Chile; Claudia Arancibia and Ernesto Ortiz, Codelco Salvador, Chile

STUDENT POSTERS**Dispersion of Oxidised Sulphur in Central Chile**

Carlos Castillo, Universidad de Chile

Evaluation of CO₂ Capture and Storage Alternatives at the Thermo-electrical Plant

Alexandra León, Universidad de Santiago de Chile

Analysis into the Technical and Economical Parameters of the Feasibility to Convert Waste Vegetable Oil into Biodiesel and its Use

Julie Alcota, Hugo Maturana, Jorge Oyarzún and Mario Gaete, Universidad de La Serena, Chile

Chemical and Isotopic Characterisation of the Elqui Basin Hydrological System

María José Carvajal, Jorge Oyarzún, Hugo Maturana and Ricardo Oyarzún, Universidad de La Serena, Chile; Jorge Nuñez, Guido Soto and Michelle Señoret, Centro de Agua para Zonas Áridas y Semiáridas de América Latina y el Caribe, Chile; Jaime Amézaga and Tobias Rotting, University of Newcastle upon Tyne, England.