

TECHNICAL AND SOCIAL PROGRAMME

11 – 13 August 2010, Sheraton Hotel & Convention Center, Santiago, Chile

WEDNESDAY, 11 AUGUST

16:00-19:00 **Registration.** Foyer, Lobby Level.

18:00-18:30 **Authors and Session Chairs Coordination Meeting.** San Cristóbal Ballroom A.

19:00-20:00 **Inauguration Ceremony.** San Cristóbal Ballroom B & C.

Welcoming Words. Carlos Barahona, HYDROPROCESS 2010 Executive Director, Gecamin.

Jesús Casas, HYDROPROCESS 2010 Technical Coordinator, Universidad de Chile.

Opening Address. *Marcelo Jo*, HYDROPROCESS 2010 Chairman, Xstrata Copper, Chile.

Chalcopyrite Atmospheric Leaching: The Golden Dream for Hydrometallurgists. Experience, State of the Art and Outlook.

20:00-22:00 **Welcome Reception.** Foyer. *Courtesy of XSTRATA COPPER.*

THURSDAY, 12 AUGUST

SAN CRISTÓBAL BALLROOMS B & C

08:20-08:30 **Day 2 Programme Presentation and News Update.**

Jesús Casas, HYDROPROCESS 2010 Technical Coordinator, Universidad de Chile.

Plenary Session 1

Chair: **Cleve Lightfoot**, BHP-Billiton, Chile.

08:30-09:15 **Barrick's Unlock the Value Program.** *Nathan Stubina*, Barrick Gold, Canada.

09:15-10:00 **Modelling of Processes in Mining Industry.** *Luis Moreno*, Royal Institute of Technology, Sweden.

10:00-10:05 **Poster Session Presentation.**

Jesús Casas, Technical Coordinator HYDROPROCESS 2010.

10:05-10:50 **Poster Session and Coffee Break.** San Cristóbal Ballroom A and Foyer.

SAN CRISTÓBAL BALLROOM B

Session 1: Geometallurgy, Testing and Scale up of Hydrometallurgical Processes.

Chair: Gabriel Meruane, SQM Industrial S.A., Chile.

- 10:50-11:10 **Bioleach of Sulphide Ores in Mini-Cribs: Option to Improve the Sulphide Leach Project in Minera Escondida.**
Jorge Leiva and Mauricio Rocha, Minera Escondida Ltda; Sergio Castro, BHP Billiton; Jorge Menacho and Francisco Troncoso, De Re Metallica Ingeniería; Alonso Arenas, CIMM, Chile; Cecilia Demergasso, Universidad Católica del Norte, Chile.
- 11:10-11:30 **Treatment of High Clay Content Ores with a Geometallurgical Focus.**
Cristian Sandoval, Jorge Picarte, Gonzalo Mendoza and Eduardo Patiño, Cía. Minera Cerro Colorado, Chile.
- 11:30-11:50 **Tia Maria Project: Metallurgical Tests for Feasibility and Engineering Studies.**
José Figueroa, Ramón Mendoza and Christian Concha, Southern Copper Co., Peru
- 11:50-12:10 **Fragmentation Model for Blasting and Crushing Processing.**
Claudia Maldonado and Miguel Calvo, Minera Spence, Chile.
- 12:10-12:30 **Ore Geotechnical Testing for Heap Leach Pad Design.**
John Lupo, AMEC Earth and Environmental, USA.

SAN CRISTÓBAL BALLROOM C

Session 2: Solution Purification and Wet Treatments.

Chair: Sergio Bustos, AREVA NC, France.

- 10:50-11:10 **Prevention of Acid Mine Drainage by Avoiding Acid Formation through Product Recovery with F-LLX™.**
Bruce Monzyk, Ming Wang, Paul Usinowicz, H. Nicolas Conkle, F. Michael Von Fahnestock and James Rose, Battelle Memorial Institute, USA; Todd Beers, Winner Global, LLC, USA.
- 11:10-11:30 **Adsorption Kinetic of Copper and Zinc from Binary Solutions using Chitosan.**
Martha Benavente, National University of Engineering, Nicaragua; Luis Moreno and Joaquín Martínez, Royal Institute of Technology, Sweden.
- 11:30-11:50 **Development of Activated Carbon Modified with Copper, for Cyanide Effluent Treatment.**
Ernesto de la Torre, Alicia Guevara and Daniel Pesántez, National Polytechnic University, Equator.
- 11:50-12:10 **Nano-Structured Calcium Silicate Hydrate – a Concrete Solution to the Sorption of Copper.**
Martin Klimsa, Giancarlo Barassi, Thomas Borrmann and James Johnston, Victoria University of Wellington, New Zealand; Fernando Valenzuela, Universidad de Chile; Joachim Kinkel, Georg-Simon-Ohm University of Applied Sciences, Germany.
- 12:10-12:30 **The Jameson Cell® of Xstrata Technology as an Economical Alternative for Organic Recovery in LIX-SX-EW Plants.**
Gabriel Vera, Claudio Hurtado-Guzman and Marcelo Jo, North Chile Division, Xstrata Copper; Luis Carvajal and Pedro Alegre, Cía. Minera Doña Inés de Collahuasi; Karina Arburo, Xstrata Technology, Chile.

12:30-14:00 **Lunch.** Pedro de Valdivia Ballroom, Level Z. *Courtesy of WEIR MINERALS*

SAN CRISTÓBAL BALLROOM B

Session 3: Gold, Silver and Precious Metals Hydrometallurgy.

Chair: Nathan Stubina, Barrick Gold Corporation, Canada.

14:00-14:20 **Desorption of Gold from Activated Carbon with Supercritical Carbon Dioxide.**

Emmanuel Otu, Indiana University Southeast, USA.

14:20-14:40 **Design, Development and Challenges of the SART Process.**

Humberto Estay and Francisco Arriagada, Arcadis-Idesol, Chile; Sergio Bustos, AREVA NC, France.

14:40-15:00 **Technology Research for Leaching and Recovery of Gold from a Sulphide Ore using Thiourea.**

Gonzalo Chávez, Edmundo Alfaro and Maribel Guzmán, Pontificia Universidad Católica del Peru.

15:00-15:20 **Gold Recovery by Chlorine Gas.**

Miguel Herrera, Marcela Mella and Jocelyn Osorio, Chilean Research Center for Mining and Metallurgy, CIMM, Chile.

15:20-15:40 **The Clarification of the Pregnant Solution as Fundamental Parameter in the Gold and Silver Recovery through the Merrill Crowe Process.**

Jorge Marquina, Cia de Minas Buenaventura SAA. – Antapite, Peru.

SAN CRISTÓBAL BALLROOM C

Session 4: Technical Applications and Developments.

Chair: Jorge Menacho, De Re Metallica Ingeniería Ltda., Chile

14:00-14:20 **Copper Crud Treatment, Concentration-Dependent Pond Depth Adjustment for Decanter Centrifuges, DControl®.**

Tore Hartmann, Ulrich Horbach and Jens Kramer, Westfalia Separator Process GmbH, Germany.

14:20-14:40 **Retrofit of SX Existing Plants Incorporation of Outotec VSF™ Technology.**

Rafaela Dellarossa, Claudio Rodríguez and Jarkko Hakkarainen, Outotec Chile Ltda; Hannu Laitala, Outotec OYJ, Finland.

14:40-15:00 **Implementation of Centrifuge Technology in the Efficient Recovery of High Grade Platinum Group Metal Concentrates.**

Cornelius Snyders, Jacques Eksteen, Nico J.S. Steenekamp and Viljoen van der Merwe, Western Platinum Base Metals Refinery, Lonmin; Nils Schwarz, Schwarz Global Consulting, South Africa.

15:00-15:20 **New Lead Anode for Copper Electrowinning.**

David Prengaman and Timothy Ellis, RSR Technologies Inc., USA.

15:20-15:40 **Aqueous Coalescer for Electrolyte and Raffinate Entrained Organic Removal.**

William Greene, SpinTek Filtration, Inc., USA; Diego Rubio, Delkor Americas, Chile.

15:40-16:20 **Poster Session and Coffee Break.** San Cristóbal Ballroom A and Foyer.

SAN CRISTÓBAL BALLROOM B

Session 5: Modelling of Leaching Operations.

Chair: Luis Moreno, Royal Institute of Technology, Sweden.

- 16:20-16:40 **Heap Leach Simulation: Effects of Process Chemistry.**
James Gebhardt, Process Engineering Resources, Inc., USA; Angélica Hernández, Process Engineering Resources, Inc., Chile; Christopher Bennett, Diane McBride and Mark Cross, School of Engineering, Swansea University, United Kingdom.
- 16:40-17:00 **Assessment of Natural and Forced Air in Ore Heaps.**
John Lupó, AMEC Earth and Environmental, USA.
- 17:00-17:20 **A New Experimental and Analytical Tool Applied to the Design of Leaching Process in Acidic Media.**
Marcela Matus, SQM S.A.; Miguel Herrera, Chilean Research Center for Mining and Metallurgy, CIMM, Chile.
- 17:20-17:40 **Using Dynamic Simulation for the Optimization of Hydrometallurgical Processes and Production Forecasting.**
Claudio Loyola, Claudio Hurtado-Guzmán and Marcelo Jo, North Chile Division, Xstrata Copper, Chile; Juan Pablo Garcés, Nelson Clavería and Rubén Inostroza, Cía. Minera Doña Inés de Collahuasi, Chile.
- 17:40-18:00 **Correlation Model for Indirect Online Determination of Calcium Carbonate in Heap Leaching with Neutron Activated Prompt Gamma Analysis.**
Osvaldo Maldonado, SAX Chile.

SAN CRISTÓBAL BALLROOM C

Session 6: Wet Processing of Industrial Minerals and Materials.

Chair: Felipe Lagno, EcoMetales Ltda., Chile.

- 16:20-16:40 **Lithium Extraction from Spodumene.**
Massoud Aghamirian, Stephen Mackie, Hans Raabe, Dan Lang, Iain Todd and Dan Imeson, SGS Minerals Services, Canada; Gary Pearse, Canada Lithium Corp., Canada.
- 16:40-17:00 **Selective Dissolution of Electrode Materials from NiMH Batteries.**
Kristian Larsson, Christian Ekberg and Arvid Ødegaard-Jensen, Chalmers University of Technology, Sweden.
- 17:00-17:20 **The Sorption of Copper by Nano-Structured Calcium Silicate Hydrate.**
Thomas Borrmann, Mathew Cairns, Martin Klimsa, Giancarlo Barassi and James Johnston, Victoria University of Wellington, New Zealand; Fernando Valenzuela, Universidad de Chile; Joachim Kinkel, Georg-Simon-Ohm University of Applied Sciences, Germany.
- 17:20-17:40 **Evolution of the Behavior of Anodes for Copper Electrowinning.**
Antonio Pagliero, Inppamet Ánodos, Chile.
- 17:40-18:00 **Industrial Plant Scale Demonstration of Geoleach™ Technology at Quebrada Blanca.**
Guillermo Kelly, Paul Harvey and Mike Gunn, GeoBiotics LLC, Chile and USA. Gunther Ahlborn and Sergio Ramos, Cía. Minera Quebrada Blanca S.A., Chile.

18:00-21:30 **Reception and Workshop Dinner**, Pedro de Valdivia Ballroom, Level Z. *Courtesy of HATCH*

FRIDAY, 13 AUGUST

SAN CRISTÓBAL BALLROOMS B & C

08:50-09:00 **Day 3 Programme Presentation and News Update.**

Jesús Casas, HYDROPROCESS 2010 Technical Coordinator, Universidad de Chile.

Plenary Session 2

Chair: **Claudio Hurtado-Guzmán**, Xstrata Copper, Chile.

09:00-09:45 **Hydrometallurgical Treatment of Arsenic, Mercury and Antimony Materials.** *Corby Anderson*, Kroll Institute for Extractive Metallurgy,

Colorado School of Mines, USA.

09:45-10:30 **Recovery of Acid from Hydrometallurgical Processes.** *Geoff Stevens*, University of Melbourne. Australia.

10:30-11:20 **Poster Session and Coffee Break.** San Cristóbal Ballroom A and Foyer.

SAN CRISTÓBAL BALLROOM B & C

Session 7: Ore and Concentrate Leaching, Studies, Operations and Processes.

Chair: **Sergio Castro**, BHP Billiton, Chile.

11:20-11:40 **Iron Removal from Kaolin Via Organic Acids Produced by Fungal Fermentation.**

Carlos Ocampo, Margarita Ramírez and Gabriel Colmenares, Universidad Pontificia Bolivariana, Colombia; Angélica Castillo and Jorge López, SUMICOL, Colombia.

11:40-12:00 **Yellow Cake Production from in Situ Recovery Operation at KATCO.**

Sergio Bustos and Henry Schnell, AREVA BGM/DI/EST, France; María Rincón and Serge Rey, SARL SM KATCO, Republic of Kazakhstan.

12:00-12:20 **Increase of the Metallurgical Recovery in the Leaching of Ores and Recovery of Copper of Acidic Solutions Through the Use of a Modified Leaching Agent.**

René Espinoza, CORMIQUIM S.A., Chile.

12:20-12:40 **Heap Leaching Processing Gravel.**

Antonio Jara, Luis Grünewald & *Guido Guiñez*, Ingeniería y Construcción AJG Ltda., Chile.

12:40-13:00 **Mine-to-Cathode: the New Hydro Business Tool**

Jorge Menacho, Patricio Chávez, Claudio López, Daniel Pineda and Francisco Troncoso, De Re Metallica Ingeniería, Chile

13:00-14:30 **Lunch.** Pedro de Valdivia Ballroom, Level Z.

SAN CRISTÓBAL BALLROOM B & C

Session 8: Solvent Extraction and Ion Exchange Developments.

Chair: Andrés Reghezza, Codelco Chile, División Norte, Chile.

14:30-14:50 **Cr(VI) Extraction from Aqueous Solutions using Polymeric Microcapsules Containing Aliquat 336[®]: Kinetics, Thermodynamics and Continuous Extraction Analysis.**

Giancarlo Barassi, Victoria University of Wellington, New Zealand; Andrea Valdés, Claudio Araneda, Carlos Basualto and Fernando Valenzuela, Universidad de Chile, Chile.

14:50-15:10 **Synergy Between Operational Practices and the Reagent Blend to Produce Improved Performance in Solvent Extraction – A Case History.**

Eladio Rojas, Cognis B.V. y Cía Ltda. Chile; David Olgún, Rodrigo Valdés and Roberto Gutiérrez, ENAMI, Chile.

15:10-15:30 **Process Stability is the Basis of Production and Quality.**

Igor Polski, IGAL Tecnología Ltda., Chile.

15:30-15:50 **Integrated Process for Copper and Zinc Recovery and Arsenic Stabilisation from Copper Smelter Dusts.**

Iván García and Felipe Lagno, Ecometales Limited Chile; Daniel Martín, Gustavo Díaz and Carlos Frías, Técnicas Reunidas S.A., Spain.

15:50-16:10 **Development of Extractants: New ACORGA[®] Formulations for Particular and Complex Applications.**

Alexis Soto, CYTEC Chile Limitada.

16:10-16:20 **CLOSING SESSION.** San Cristóbal Ballroom B & C.

Workshop Balance and Final Comments. HYDROPROCESS 2010 Organising Committee:

Marcelo Jo, HYDROPROCESS 2010 Chairman. Xstrata Copper, Chile.

Jesús Casas, HYDROPROCESS 2010 Technical Coordinator. Universidad de Chile.

Carlos Barahona, HYDROPROCESS 2010 Executive Director. Gecamin, Chile.

16:20-17:30 Farewell Reception. Foyer.

POSTERS SESSION

Hydrometallurgical Treatment of Arsenic, Mercury and Antimony Materials.

Corby Anderson, Kroll Institute for Extractive Metallurgy, Colorado School of Mines, USA.

Development of Processes for Partitioning and Transmutation and Metal Recycling.

Christian Ekberg and Gunnar Skarnemark, Chalmers University of Technology, Gothenburg, Sweden

Heap Leaching Processing Gravel.

Antonio Jara, Luis Grünwald & Guido Guiñez, Ingeniería y Construcción AJG Ltda., Chile.

Technology Research for Leaching and Recovery of Gold from a Sulphide Ore using Thiourea.

Gonzalo Chávez, Edmundo Alfaro and Maribel Guzmán, Pontificia Universidad Católica del Peru.

The Clarification of the Pregnant Solution as Fundamental Parameter in the Gold and Silver Recovery through the Merrill Crowe Process.

Jorge Marquina, Cia de Minas Buenaventura SAA. – Antapite, Peru.

STUDENT POSTERS

Electrodialysis of Cyanide Solutions.

Andrea Lillo, Pontificia Universidad Católica de Valparaíso, Chile.

Optimization Study to Recover of Tin from Tailings.

Rocio Machaca, UNAS, Peru

Arsenic Behaviour in the Hydrometallurgical Processes.

Einar Barrientos, Universidad de Antofagasta, Chile.

Metallurgical Initial Tests for Copper Ore Oxide from Sossego Mine Cell Leaching Parameters Determination.

Ana Rabelo de Lima, Universidade Federal do Pará – UFPA, Brazil.

Chemical Equilibrium of the Solvent Extraction of Divalent Metals by D2EHPA in Sulfate Media.

Clenilson Sousa Junior, Federal University of Rio de Janeiro, Brazil.

Leaching of Lateritic Rubbles Applied Pyroligneous Acid.

Yayne Beltran Guilarte, Universidad de Oriente, Cuba.

Technical-economic evaluation to level profile of the industrial implementation of the in situ leaching in MINA SUR.

Daniela Nuñez, Universidad de Concepción, Chile.

Comparative Analysis of the Sulfur Formed Under Two Different Ferric Leaching Mechanisms, for Zinc Sulfide Concentrates.

Baldermar Camacho, Universidad Autónoma de San Luis Potosí, Mexico.

Biotechnology Approach: Improving the bacterial Bioleaching by transforming Acidithiobacillus ferrooxidans with the introduction of genes for resistance to noxious compounds.

Eduardo Romo, Universidad Arturo Pratt, Chile.

Use Anionic Exchange Resin for the Recovery of the Complex Gold Thiosulfate from aqueous solutions.

Miriam Chaparro, Universidad Autónoma de Baja California-USON, Mexico.

Extractive Crystallization of Sodium Perrhenate Sustainably.

Elizabeth Sepúlveda, Universidad de Chile.

Selección de Desmoldante para moldeo de ánodos de cobre, Fundición de Concentrado Chuquicamata, DCN.

Andrea Carrillo, Pontificia Universidad Católica, Chile.

The Use of an Ionic Liquid as Extractant in Copper Solvent Extraction Process.

Cristian Gahona, Pontificia Universidad Católica de Valparaíso, Chile.

Application of Ionic Liquids in the Solvent Extraction Process of Copper.

Juan Veragua, Pontificia Universidad Católica de Valparaíso, Chile.

Hydrometallurgical Treatment Alternatives of Anodic Slimes from Electrowinning.

Eduardo Esquivel, Universidad de Santiago de Chile