

JANUARY 23-25, 2018
THE WESTIN HOTEL
OTTAWA, CANADA

2018 Conference



Technical Program at a Glance

TUESDAY

8:30

OPENING REMARKS

Johnna Muinonen, CMP 2018 Chair

8:45

50 Years of Innovation by Canadian Mineral Processors

Jan Nasset, NesseTech Consulting Services Inc.

9:30

Grinding Media Sizing Studies: Past, Present and Future

Robert Mclvor, Metcom Technologies Inc.

9:55

Mount Isa Mines Necessity Driving Innovation

Virginia Lawson, Glencore Technology

Break 10:20

10:50

Using Operational Readiness and Plant Trials to Successfully Implement a Process Flowsheet

Andrew Taylor, Vale

11:15

Two Generations Later: Industrial Modelling and Optimization of Gold Cyanidation

Paul Fournier, Detour Gold

11:40

The Development of Modern Flowsheeting Tools for Mineral Processing – Integrated Process Mineralogy: Decades in the Making

Norman Lotter, Flowsheets Metallurgical Consulting

Networking Luncheon (provided) 12:05

13:35

Using QEMSCAN Mineral Exposure to Predict Rougher Recovery

Sarah Prout, SGS Minerals

14:00

Improving the Flotation Circuit Performance using Empirical Simulation at Nunavik Nickel

Léa Ebacher, Université Laval

14:25

Reagent Selection at the Gibraltar Mine for Improved Process Performance

David C. Miller, Chevron Phillips Chemical Company LP
Francis Chachula, Gibraltar Mines Ltd

14:50

Resolving Detrimental Seasonal Effect on the Flotation Processes at Niobec

Jean-Sébastien Marois, Niobec Inc

Pre-Panel Reception (provided) 15:15

15:45

Panel - Collaboration and Innovation in Mineral Processing – Forging Canadian Leadership

Panel Members; Jean Robitaille, Agnico Eagle, Simon Hille, Goldcorp, Janice Zinck, Canmet, Domonic Fragomeni, XPS Consulting and Test Work, Nathan Stubina, McEwen Mining, Erin Bobicki, University of Toronto, Robert Stephens, Teck Corp.

Day 1 Concludes 16:45

Chair's Reception 21:00

WEDNESDAY

8:30

The Otjikitoto Gravity Circuit, Test Work, Design, Commissioning, and Operation

Michael Fullam, FLSmidth

8:55

SART Implementation at Heap Leach Operation in Mexico

David Kratochvil and David Salari, BQE Water

9:20

Carbon Scout -Automating Carbon Measurement and Control in CIP/CIL Circuits

Greg Rasmussen, Gekko

Break 9:45

10:15

Organic Carbon Mitigation at Peñasquito

Peter Lind, Goldcorp

10:40

Optimizing the Carbon Circuit at the Yound-Davidson Mine using CIP/CIL Modelling

Tyler Cray, SGS Canada

11:05

Best-Practice Considerations for Bullion Handling

Ziad Yamak, Goldcorp Musselwhite Mine

CMP AGM and Luncheon (provided) 11:30

13:00

Sustainable Comminution: Giving Mining Clients What They Need, Expect, and Deserve

John Starkey, Starkey and Associates Inc.

13:40

Simulation for Ball Mill Sizing: the Path to a Successful Plant Start-up

Antoine Berton, Soutex

14:05

Multi Stage HPGR Circuits – Increasing the benefit across the comminution flow sheet

Tim Lundquist, WEIR Venlo

14:35

Canada Fluorspar (NL) Inc. St. Lawrence Fluorspar Project – Flowsheet Development

Erin Legault-Seguín, SGS

Break 15:00

15:30

Pyrrhotite Rejection at the Strathcona Mill

Ravinder Multani, XPS Expert Process Solutions
Curtis Deriden, Glencore

15:55

Advanced Iron Endpoint Control During Nickel/Copper Matte Converting: A Techno-economic Analysis Study

Christopher P. Baxter and Andriy Plugatyr, National Research Council Canada

16:20

Benchmarking Performance of the Two-Stage StackCell™ with Conventional Flotation for Copper Sulfide Applications

Eric Wasmund, Eriez Flotation

Day 2 Concludes 16:45

Gala 19:00

THURSDAY

8:30

Yamana Chapada's Mine Story

Tuhin Banerjee, Woodgrove Technologies

8:55

Evaluation of Cave-to-Mill Opportunities at the New Afton Mine

Stefan Nadolski, University of British Columbia

9:20

Canada Fluorspar (NL) Inc. St. Lawrence Fluorspar Project – Project Description

Melissa Baker, Canada Fluorspar Inc.

Break 9:45

10:15

Silica Removal from Uranium Process Solutions with PEG – Finding New Success from Old Ideas

Logan Verhelst, Cameco

10:40

Evaluation of On-Line Particle Size Distribution Measurement for Oil Sands Tailings Treatment

Erfan Sharifi, Outotec

11:05

APC at Laronde : The Progressive Control Approach

Yanick Dumais, Agnico Eagle
Tuhin Banerjee, Woodgrove Technologies

Lunch 11:30

13:00

Evaluating the Effects of Sensor Based Sorting on Lithium Processing and Mine Economics Using Advanced Process Simulation Software

Jörn Rohleder, Outotec

13:25

Ore Pre-concentration by Bulk Sorting Using Real Time Elemental Analysis

Henry Kurth, Scantech

13:50

Waste to Ore: A Goldcorp Story

Kevin Murray, Goldcorp

14:15

The Premise of Profit Recovery™ and Applied Ore Sorting Examples

Brent Hilscher, Sacre-Davey Engineering

Pre-Panel Reception (Provided) 14:40

15:15

Panel - Ore Sorting; Will Sorting Provide the Gains Expected in Grinding and Energy Efficiency

Panel Member; Kevin Murray, Goldcorp, Johnna Muinonen, RNC Minerals, Brent Hilscher, Sacre-Davey, Harold Cline, Torma, Lutke von Kettelhodt, Steinert US, Paul Staples, Ausenco, Bern Klein, University of British Columbia, Andrew Bamber, MineSense

Closing Reception (Provided) 16:15

Conference Concludes 17:30



CONFERENCE OVERVIEW

Sunday, January 21st

8:00 - 17:00 Short Courses, Westin 4th Floor

8:00 – Registration and breakfast

9:00 – Full day courses start

- Workshop on National Instrument 43-101 – Room: Alberta
- Bulk Solids Handling: How to Avoid Being a Statistic – Room: New Brunswick
- Advances in Sensor Based Sorting - Room: Newfoundland/Nova Scotia

12:00 – 1:00 Short course luncheon

- Quebec room

Monday, January 22nd

8:00 - 17:00 Short Courses, Westin 4th Floor

8:00 – Full day course registration and breakfast

9:00 – Full day courses start

- Screening Theory & Practical Considerations in Operating Screening Equipment Efficiently – Room: Nova Scotia
- Gold Gravity Concentration – Room: Alberta

12:00 – 1:00 Short course luncheon (Quebec Rm)

12:00 – Half-day courses start (includes lunch)

- Mineral Processing Plant Debottlenecking: Tools/Methodology – Room: New Brunswick
- Thickener Operation – Use of Instruments to Optimize Thickener Performance – Room: Newfoundland

8:30 - 14:00 Board of Directors Meeting
Colonel By Suite, 23rd Floor

9:30 - 21:00 Conference Registration
4th Floor Westin Hotel

19:00 - 23:00 Welcome Reception
Governor General I, 4th Floor

Tuesday, January 23rd

7:00 - 8:15 Authors' Breakfast
Quebec Room, 4th Floor

7:00 - 15:15 Registration
4th Floor Westin Hotel

8:30 - 16:45 Technical Program
Confederation Ballroom

12:05 - 13:35 Tuesday Networking Luncheon
Governor General Ballroom

18:00 - 20:00 Ray MacDonald Hockey Challenge
Carleton University

21:00 - 24:00 Chairman's Reception
Governor General Ballroom I

Wednesday, January 24th

7:00 - 8:15 Authors' Breakfast
Quebec Room, 4th Floor

7:30 - 15:15 Registration
4th Floor Westin Hotel

8:30 - 16:45 Technical Program
Confederation Ballroom

11:30 - 13:00 Wednesday Luncheon and Annual
Business Meeting
Governor General Ballroom

18:00 - 19:30 Executive Reception
Suite 22, 22nd Floor - *Invitation only*

18:30 - 19:30 Banquet Reception
4th Floor, Ballroom Foyer

19:30 - 22:00 Annual Banquet
Confederation Ballroom, 4th Floor

22:00 - 24:00 Post Banquet Reception
Governor General I, 4th Floor

Thursday, January 25th

7:00 - 8:15 Authors' Breakfast
Quebec Room, 4th Floor

7:45 - 15:15 Registration
4th Floor Westin Hotel

8:30 - 16:00 Technical Program
Confederation Ballroom

11:30 – 13:00 Student Luncheon - *Invitation Only*
Governor General I, 4th Floor

15:15 – 17:30 Closing Reception
Confederation Foyer

19:00 – 22:00 Board of Directors Dinner
Daly's, 3rd Floor

Friday, January 26th

8:30 - 12:00 Board of Directors Meeting
Colonel By Suite, 23rd Floor

WELCOME LETTERS



PRIME MINISTER • PREMIER MINISTRE

January 23–25, 2018

Dear Friends:

I am pleased to extend my warmest greetings to everyone attending the 50th Canadian Mineral Processors Conference.



This event provides a wonderful opportunity for industry professionals to share their knowledge and look ahead to the challenges and opportunities of the future. The presentations and discussions planned for this conference will give everyone in attendance a chance to explore the latest technologies, accessories and services.

I would like to commend the organizers for arranging a stimulating program. I am sure that delegates will benefit from the informative sessions and networking opportunities available, and will return to their work inspired to put what they have learned into practice.

Please accept my best wishes for a memorable and productive conference in Ottawa.

Sincerely,

The Rt. Hon. Justin P.J. Trudeau, P.C., M.P.
Prime Minister of Canada

WELCOME LETTERS



PRIME MINISTER • PREMIER MINISTRE

Du 23 au 25 janvier 2018

Chères amies, chers amis,

Je suis heureux de présenter mes salutations les plus chaleureuses à celles et ceux qui assistent à la 50^e conférence annuelle des minéralurgistes du Canada.



Cet événement est une excellente occasion pour les professionnels de l'industrie de partager leurs connaissances et de se pencher sur les enjeux et les possibilités de l'avenir. Les présentations et les discussions en groupe prévues à cette conférence permettront à tous les participants de découvrir les dernières percées en matière de technologies, d'accessoires et de services.

Je tiens à féliciter les organisateurs d'avoir mis sur pied un programme stimulant. Je suis convaincu que les délégués profiteront des séances d'information et des possibilités de réseautage qui s'offriront à eux, et repartiront avec le désir de mettre en pratique ce qu'ils auront appris.

Je vous souhaite une conférence des plus mémorables et fructueuses à Ottawa.

Cordialement,

A handwritten signature in blue ink, which appears to be "Justin Trudeau".

Le très hon. Justin P. J. Trudeau, C.P., député
Premier ministre du Canada

WELCOME LETTERS

CHAIR'S WELCOME



Welcome to Ottawa and the 50th Annual Meeting of the Canadian Mineral Processors! On behalf of the CMP Executive it is my pleasure to welcome all delegates to this very special year at the conference as we look back at our past, and ahead to our future. This conference provides an opportunity for members of our mineral processing community to exchange and engage in a balanced technical and social program covering all aspects of mineral processing.

First things first, you may have noticed our new logo! The logo is simple but provides homage to the past through the shapes and colours. The stand-alone design can be used for branding and with the optional accompanying wording is fully bilingual. In coming years there will be increasing bilingual content and we will be looking for feedback on this approach as we move forward.

Brian Danyliw, this year's first Vice Chair, has put together an excellent technical program for this celebratory year, with 35 delegate papers plus a plenary presentation by Jan Nettet titled 50 Year of Innovation by Canadian Mineral Processors. To commemorate this occasion, Jan and his team have compiled the stories of many of the important innovations by Canadians and Canadian technology providers over the past 50 years. These stories have been published as a hard cover volume that is provided to all delegates as part of the conference registration, and constitute an important historical record of our industry and the role of the CMP.

In addition, there are two panel discussions that I am sure will be full of thought-provoking discussions. On Tuesday afternoon the first one will be on Innovation and Collaboration and the second on Wednesday afternoon will be on Energy Efficiency through Ore Sorting. This year we have continued the tradition of a Short Course Program, with a variety of courses covering a range of subjects led by industry experts. I would also like to invite you to participate in this year's social program which includes a 50th Welcome Reception on the Monday evening starting at 7pm, which is open to all registered delegates, the networking lunch Tuesday, the Chairman's Reception Tuesday evening, the business meeting lunch on Wednesday, and finally the banquet and reception on Wednesday evening. As well, on Tuesday evening the CMP hosts the annual East vs. West Ray MacDonald Memorial Hockey Game to whom the famed Kilborn Cup will be hoisted in triumph. The entire CMP community has continued to be very active in the industry throughout 2017. Our ten regional branches have been active with annual technical meetings, short courses, social activities and student support with over 1000 delegates attending the various meetings around the country.

This year we are piloting National CMP working with the regional branches to solicit applications for young engineers in the first 5 years of their career to request funds to attend this National CMP conference. We are hoping that this will allow more young engineers from operations to attend the conference and raise the profile of the value of our conference within their companies.

For those feeling up to it, or needing some fresh air on Wednesday morning you are welcome to join Stephanie Vo, Paul Blatter and myself for a short jog in and around Ottawa (rain, snow, cold, it's a go!). As well, Berge Simonian is organizing a squash club again this year!

Enjoy the Conference!

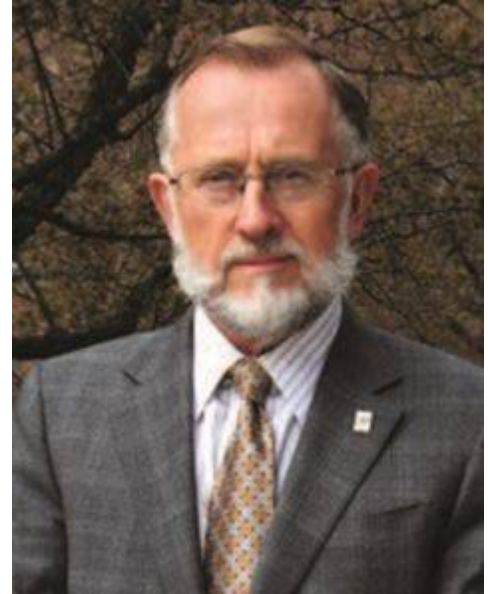
A handwritten signature in black ink, appearing to read 'Johnna Muinonen'.

Johnna Muinonen
CMP 2018, Chair

WELCOME LETTERS

MESSAGE FROM CIM

On behalf of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) I welcome you all to this year's Conference in Ottawa. This year we celebrate two anniversaries, the Canadian Mineral Processors (CMP) 50th and the CIM's 120th. Both were created from humble beginnings by forward thinking individuals and reflect the important role mining has played in the history of this great nation.



In 1968 the Canadian Gold Metallurgists (CGM), at an annual meeting in Ottawa, invited the base metal mines to form CMP. This was followed by the iron industry invited to join in 1971 and in addition, CMP expanded to invite technical personnel to participate who were directly connected to processing gold, base metals and ferrous ores in Canada. The tradition of holding the annual meeting in Ottawa continues to this day. The origins of CGM were modest. Three gold mill superintendents, Messrs. Carter, Gordon and Sullivan, met in the Timmins, Ontario region to discuss common issues and challenges in 1957. Six years later, representatives of 27 of the 40 gold mills in Canada decided to officially form the CGM. It should be noted that CanmetMINING and its predecessors in Ottawa have played an important role in supporting CMP.

In January 1981, CMP members voted to become a "society" within CIM. CMP today is one of the larger thriving organizations of the nine societies and twenty-five Branches of CIM. For me personally, when I emigrated from Southern Africa in 1980, it was membership in CMP that offered me a way into the mining community. I have fond memories of the CMP conferences and am proud as CIM President to give back what I have learnt over the years, to CMP and CIM.

CIM was created in 1898 just 21 years after Confederation. CIM consolidated various Provincial mining associations, one of which even pre-dated Confederation. The objective was to have a national voice and network over the vast Canadian landscape. So, as we gather to celebrate 120 years, we are also doing our part to serve that original purpose.

Today Canada produces 60 minerals and metals and is among the world leaders in many of these. In 2015 mining contributed 3.5% to national gross domestic product and directly employed 380,000 personnel and if we include service providers and vendors that number exceeds one million.

So, enjoy and celebrate the CMP 50th anniversary with the knowledge that we, "mining folk", make a significant contribution to Canada's people.

A handwritten signature in black ink, appearing to read 'Ken Thomas', written in a cursive style.

Kenneth (Ken) G. Thomas
CIM President

WELCOME LETTERS

MESSAGE FROM CANMET



It is my great pleasure this year again to provide my full support to the Canadian Mineral Processors and especially on the celebration of its 50th anniversary.

Fifty years ago CanmetMINING, then known as the Mines Branch of the Department of Mines and Technical Surveys, was instrumental in bringing together operators from Canada's gold industry to form the Canadian Gold Metallurgists – now known as the Canadian Mineral Processors (CMP). The first meeting took place at Camsell Hall, on Booth Street Complex in Ottawa, on the Mines Branch Campus (now Natural Resources Canada - NRCan) in 1964.

NRCan, through its CanmetMINING research facilities, continues to actively support the Canadian Mineral Processors serving as the Secretariat for the 3000+ member organization through management of CMP's national office. In addition to filling two executive positions, CanmetMINING is also the organizer for the annual operators' conference. The organizing committee is a very small and efficient team and includes the following CanmetMINING current and retired employees – Wesley Griffith, Rory Cameron, John Chaulk, Al Kuiper, Dave Hardy, Louise Madaire and Janice Zinck.

The symbiotic relationship between the CMP and CanmetMINING is mutually beneficial, bringing value to both organizations for over fifty years and long into the future to advance innovation in mineral processing.

The annual CMP conference is internationally recognized as one of the premier conferences and one of the largest gatherings of mineral processing professionals in the world and is the place to find experts who can develop innovative technologies and solve challenging problems.

It is my great pleasure this year to assure you that CanmetMINING will continue its on-going support to CMP and will continue to contribute to the achievements of its strategic objectives.

Regards,

A handwritten signature in blue ink, appearing to read 'Magdi Habib', written in a cursive style. The signature is enclosed within a blue oval shape.

Dr. Magdi Habib, Ph.D.
Director General of CanmetMINING
Lands and Minerals Sector
Natural Resources Canada

WELCOME LETTERS

MESSAGE FROM THE TECHNICAL PROGRAM CHAIR



On behalf of the CMP Executive Committee, I would like to thank you for your interest in the 50th Annual Meeting of the Canadian Mineral Processors, a Technical Society of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM). This publication has been compiled to provide a permanent record of the technical papers presented at the conference.

The Meeting continues in its tradition of providing an unsurpassed experience with our successful Student Program, social events, multiple short courses and the well-attended Technical Program and offers an expanded experience to commemorate our 50th year which includes two round table panel discussions on topics most relevant to the mineral processing industry in Canada and an expanded program of social events.

Our sponsorship program for this 50th Canadian Mineral Processors Conference was expanded to allow for additional opportunities. The response to this expanded sponsorship program has been overwhelming and allows us to not only offer the expanded social program to our delegates but also allowed us to create and publish a commemorative look back at 50 years of innovation in mineral processing in Canada which every delegate will receive. Sponsorship also allows us to once again sponsor students from across the country to attend the conference and I encourage every conference delegate to engage with and interact with these future leaders of mineral processing across Canada and the world.

This year's technical program response has been outstanding with papers on new operations, operational improvements, process optimisation, and process control across several commodities with once again exceptional comminution, gold processing and flotation sessions. We have also included two round table panel discussions in this year's program and I would like to thank the panelists who have volunteered to participate in the discussion on Collaboration and Innovation in Mineral Processing as well as Ore Sorting. Thank you to the many operations and companies that support the mineral processing industry for sharing their talent and experience and providing an interesting and informative technical program for us. Taking the time to prepare the technical papers within their busy schedules and sending delegates to our conference is greatly appreciated.

Finally, I'd also like to thank all those involved in the preparation of technical program which includes those who submitted excellent abstracts, CANMET and the 2017-2018 CMP Executive Committee (Scott Martin, Johnna Muinonen, Stefanie Vo, Rory Cameron, Wesley Griffith and Janice Zinck). I hope you enjoy the conference.

Regards,

Brian Danyliw
CMP Technical Chair
January 2018

CMP 2018 – ABSTRACTS

TUESDAY, JANUARY 23rd
Morning Session

07:30 - CONTINENTAL BREAKFAST – PROVINCES BALLROOM

08:30 – Opening Remarks
Johnna Muinonen, Chair CMP 2018

PLENARY PRESENTATION

08:45 - PAPER 1

50 Years of Innovation by Canadian Mineral Processors

J. Nessel – NesseTech Consulting Services Inc.

The past 50 years have been a golden era, not just for the CMP but also for the development and success of Canadian technologies in the field of mineral processing. The CMP has played a critical role of technology transfer agent, and the success of these technologies is also linked to the success of the CMP itself. The presentation will cover, in brief, the growth of the CMP from its origins as the Canadian Gold Metallurgists in 1964, with some 39 attendees, to the present day when the annual meeting sees 500 and more from a dozen countries. Also covered will be selected technology success stories from the 50th anniversary volume to be given to all delegates 'Canadian Contributions to Mineral Processing Technology 1968-2018'. The volume itself highlights some 40 technologies that have been divided into five categories; process water treatment and minesite environment, technology innovations, innovations in operations, technology providers and university contributions. Some international perspectives will also be shared.

NOTES:

09:30 - PAPER 2

Grinding Media Sizing Studies: Past, Present and Future

W. Conger – ME Elecmetal

J-F. Dupont – Detour Gold Corporation

R. McIvor – Metcom Technologies Inc.

T.P. Weldum – Cleveland Cliffs Iron Company

These studies address the relationship between mill media sizing and its grinding efficiency. Starting with the results from a review of the literature, the issues of initial media sizing for a new ball milling circuit, and then optimal media sizing for an existing milling operation, were studied. The Functional Performance parameters "Mill Grinding Efficiency" and cumulative "Mill Grinding Rates" from both plant and test-scale equipment were used, and provide valuable new insight into this topic. A plant media sizing diagnostic tool is presented, as are newly developed testing equipment and evaluation methods, and recent case studies.

NOTES:

CMP 2018 – ABSTRACTS

09:55 – PAPER 3

Mount Isa Mines Necessity Driving Innovation

V. Lawson, H. DeWaal, G. Heferen, N. Aslin, P. Voigt, and M. Hourn – Glencore Technology

Mount Isa Mines (MIM) acquired a reputation for the successful application of R&D to develop break-through technologies for the mining industry starting in the 1978's through until the early 2000's. The ISAPROCESS™ tank-house technology has been licensed to copper refineries throughout the world, and a significant per cent of the world's copper is refined using this technology. Since development in the late 1980's more than 20 ISASMELT™ copper and lead smelting furnaces are now installed in countries around the world. Jameson Cell flotation technology developed jointly by Mount Isa Mines and Professor Graeme Jameson is widely used in the Australian coal mining industry and increasingly in the base-metal and gold industry. The IsaMill™'s developed at Mount Isa and McArthur River made it possible to develop the McArthur River and George Fisher orebodies and has been successfully implemented into base metal fine grinding applications around the world. The most recent commercialised innovation is the atmospheric leach Albion Process™ with its supersonic HyperSparge™ gas sparger, is being adopted as a solution to the increasing complexity of orebodies.

MIM's contribution to the industry was significant given the size and the remote location of its operations with Townsville Copper Refineries more than 1350 km and Mount Isa 1800 km from the nearest state capital of Brisbane. This paper will briefly discuss the development of each of these technologies and why MIM – now owned by Glencore - was so successful innovating and developing such technologies over a period of nearly 40 years.

NOTES:

10:50 – Paper 4

Using Operational Readiness and Plant Trials to Successfully Implement a Process Flowsheet Change

A.J. Taylor, C.H. Buck, and J. Hall – Vale

In 2015 Vale's Clarabelle Mill began the process change to enable a higher degree of Cu separation. The flowsheet modification was part of a complete divisional flowsheet change being implemented in Vale's Sudbury Operations. This paper will centre on some of the Operational Readiness (OR) work, culminating in the commissioning of the circuit in March 2017. The emphasis will be on the implementation of an integrated test plan to prepare for the process flow change through the mill.

NOTES:

10:20 BREAK – PROVINCES BALLROOM

CMP 2018 – ABSTRACTS

11:15 – PAPER 5

Two Generations Later: Industrial Modelling and Optimization of Gold Cyanidation

*M. Wilson, F. Bélanger, and P.A. Fournier –
Detour Gold Corporation*

Modelling and optimization techniques used in the operation of the Detour Lake Mine leach circuit are contrasted to a 1973 review of contemporary techniques used by a major gold producer. The leach circuit at the Detour Lake Mine was modelled using a full factorial Design of Experiment of stirred tank reactor leach tests using circuit feed. Contour plots of extraction were applied in the plant to optimize addition rates of cyanide and the newly-commissioned lead nitrate system. Contour plot sections were used to understand the impact of sulphur in circuit feed at different operating dissolved oxygen concentrations. The 1973 review paper offers insight into industrially-applied modelling and optimization techniques. In particular, a mathematical model of plant data was developed using multilinear stepwise regression analysis. The model was presented using graphical representations available at the time and applied to optimize the rates of cyanide addition. Off-the-shelf software solutions of today allow mineral processors to quickly and easily visualize data, allowing them to re-allocate time and resources spent processing data to generating raw data and extracting actionable information.

NOTES:

11:40 – PAPER 6

The Development of Modern Flowsheeting Tools for Mineral Processing – Integrated Process Mineralogy: Decades in the Making

*N.O. Lotter – Flowsheets Metallurgical
Consulting Inc.*

The connection between mineralogy and metallurgical performance in a plant was recognised long ago (Gaudin, 1939; Petruk, 1976; Petruk and Hughson, 1977; Cabri, 1981; Petruk and Schnaar, 1981; Kinloch, 1982; Peyerl, 1983, Baum et al 1989 for example). The modern toolbox that we now routinely use for flowsheet development took decades to develop (Lotter et al., 2002; Baum and Lotter, 2004; Lotter, 2011 for example). Many workers contributed considerable time and effort to this overall mission of connecting sampling, mineralogy and mineral processing to integrate the flowsheet development activities. Certain key milestones marked this journey, such as Gy's treatise on the sampling of particulate materials in 1979, which was later added to by François-Bongarçon, Pitard, Minnitt, and Holmes for example. The development of QEM*SEM by Gottlieb et al. of the MLA by Gu et al. constituted a huge leap forward in accuracy and mineral measurement capacity, as well as a reduction in standard errors of mineral characterisation. The advancement of the microprobe to an automated platform made a significant difference to detailed compositional mineralogy. This led to a strong position from which to draw meaningful processing implications from the mineralogical data. Reproducible flotation testing and reliable plant survey material for characterisation was dealt with by, amongst others, High Confidence Flotation Testing (Lotter, 1995; Runge, 2010, and Bradshaw, 1997); and Statistical Benchmark Surveying (Lotter, 2005), with earlier prototypes which were steadily improved (Lotter, 1994; Restarick, 1976). The sterling work of Napier-Munn in engaging sound statistical methods with mineral processing led to the successful design and use of methods that could identify and quantify small recovery gains in plant scale trials. This history and present capability are reviewed, including leverage into asset management.

NOTES:

**12:05 NETWORKING LUNCH – GOVERNOR
GENERAL BALLROOM**

TUESDAY, JANUARY 23rd
Afternoon Session

13:35 - PAPER 7

Using QEMSCAN Mineral Exposure to Predict Flotation rougher Recovery

*J.M. Lang, S.J. Prout, D. Lascelles, and K. Sarinas – SGS Minerals
 N. Redman – Teck Resources Ltd.*

There is a growing demand for ore characterization methods to support metallurgical development programs from a true geometallurgical perspective. Today, there are multiple automated mineral analysis systems on the market, many of which are based on conventional mineral liberation data. However, liberation data can be limited when assessing the floatability of a mineral to predict its recovery as it doesn't consider the surface area available for collector absorption and bubble attachment; whereas mineral exposure measurements can. Using the First-Order Rate equation to predict the recovery versus time of variously exposed particles, a model has been developed to predict the recovery of copper sulphides at a particular grind size. This model provides the opportunity for the prediction of copper recovery and grade from multiple, small-scale samples. These predicted values can be imported into resource modeling software, and guide the domaining of geometallurgical units within the ore body. Data has been analyzed from various global copper porphyry systems and compared with actual flotation testwork.

NOTES:

14:00 - PAPER 8

Improving the Flotation Circuit Performance using Empirical Simulation at Nunavik Nickel Concentrator

*L. Ebacher, J. Bouchard, and A. Clapperton – Université Laval
 N. Singh – Canadian Royalties Inc.
 R. Araya – Consultant Mineral Processing*

Canadian Royalties Inc. owns and exploits the Nunavik Nickel project: a copper and nickel deposit in Nunavik, Quebec. Froth flotation is used to produce nickel and copper concentrates. As is the case at other operations, the presence of magnesium is detrimental to the flotation products. In the past year, the exploitation of a new deposit has increased magnesium in the feed. Thus, it has been challenging to meet the required ratio in the final nickel concentrate.

In search for a consistent solution for this problematic, an empirical flotation simulator making use of selectivity curves was developed. The circuit was expressed as a system of linear equations, which considered the distribution of copper, nickel and gangue minerals in the different streams. The relative quantities of each mineral are given by the separation efficiency curves of the various banks in the circuit. Three sources of data were used to calibrate the simulator: historical plant data (metallurgical balance), infinite dilution bench-scale flotation tests, and direct sampling of flotation cells. The calibrated separation curves were used to predict the recovery of the different species based on a single mineral recovery.

Validation of the simulator showed good fit for the valuable minerals. The simulator was then used to infer the optimal operating conditions of the flotation circuit to optimise magnesium oxide content of the nickel concentrate. Simulation of two re-arrangements of the circuit gave a promising solution with a Fe:MgO ratio 2.42 times higher than the minimum value.

NOTES:

CMP 2018 – ABSTRACTS

14:25 - PAPER 9

Reagent Selection at the Gibraltar Mine for Improved Process Performance

F. Chachula and A. Molinaro – Gibraltar Mines Ltd.

D. Miller – Chevron Phillips Chemical Company

Sulphide mineral flotation operations continuously strive for a balance between mineralogy, mineral liberation, circuit conditions and reagent solutions to maximize the production rate and recovery of payable metals. The Taseko Gibraltar copper – molybdenum mill operations underwent an extensive project focusing on the fundamentals to identify the effects of process conditions and mineral liberation to improve the bulk circuit copper – molybdenum recovery efficiencies in the bulk flotation circuits. This discussion will provide process data that demonstrates; 1) fundamental relationship between mineral liberation to recovery and grade, 2) flotation circuit condition testing and optimization, 3) reagent combinations resulting in efficient/economical mineral recovery, and 4) the development of a xanthate free reagent solution. The data presented and discussed will also touch on flotation parameters including pH, retention time, kinetics and the effect on bulk circuit recovery performance.

NOTES:

14:50 - PAPER 10

Resolving Detrimental Seasonal Effect on the Flotation Processes at Niobec

J-S. Marois, D. Downey, G. Matton, and Y. Dodier – Niobec Inc.

F. Cappucitti – Flottec LLC

The flotation processes of the Niobec Mine have been affected by a seasonal loss of recovery and a significant increase in reagent consumption over the past few winters. This paper discusses the problem-solving methodology that was used to identify the root causes, to develop solutions and to implement changes that resolved the problem to restore the process to summer-like conditions year-round. Mainly, it was found that the process water was contaminated by phosphates ions, which adversely affected the carbonate pre-flotation, and caused detrimental effects on the subsequent niobium flotation. The phosphate ions were being generated by the process itself, but were consumed by algae in summer conditions. It was determined in laboratory studies that concentrations as low as 5 ppm were enough to affect the circuit and that the multiple additions of process water throughout the circuit was worsening the effect. Also, temperature was found to have an impact on the reagent performance. The performance of the plant was restored by implementing a natural treatment of our process water with a simple cost-free rearrangement of our circuit streams. In addition to that, our extensive geometallurgical program was used to provide ore to the plant restricting phosphate generation in the process. Also, a modification of the collector was developed and introduced in the carbonate pre-flotation that provided improved performance during the periods of low pulp temperature.

NOTES:

15:15 PRE-PANEL RECEPTION – PROVINCES BALLROOM

15:45 – Panel Discussion

Discussion Collaboration and Innovation in Mineral Processing – Forging Canadian Leadership

Panelists: Jean Robitaille, Agnico Eagle, Simon Hille, Goldcorp, Janice Zinck, CanmetMINING, Dominic Fragomeni, XPS Consulting and Test Work, Nathan Stubina, McEwen Mining, Erin Bobicki, University of Toronto, Rob Stephens, Teck Corp.

Moderator: Scott Martin

NOTES:

WEDNESDAY, JANUARY 24th
Morning Session

07:30 - CONTINENTAL BREAKFAST – PROVINCES BALLROOM

8:30 – PAPER 11

The Otjikoto Gravity Circuit: Test Work, Design, Commissioning, and Operation

E. Barnard, J. Tero, S. Mbalamba, and A. Nashitati – Otjikoto Mine

N. Avenido and J. Rajala – B2GOLD Corporation

M. Fullam – FLSmidth Ltd.

J. Carrillo – Consep Pty Ltd.

The Otjikoto mining and milling complex is 90% owned by B2Gold Corporation, and began commercial operation on February 28, 2015. The milling circuit operates at a throughput 3.3 million tonnes per annum, with an average reserve gold grade of 1.28 g/t. The ore is high in Gravity Recoverable Gold (GRG), which varies between 73-91%, depending on ore type. Overall gold recovery since start-up is 98.2%, with about 63.5 % coming from the gravity circuit as doré. 2016 cash operating costs, and all in sustaining cost ("AISC") were \$361 and \$604 per ounce, respectively.

During design, three ore types were tested for GRG content, and based on the high GRG value of all three ore types, the decision was made to treat the full ball mill circulating load by gravity. Once operating, the gravity circuit performance was characterized by performing a detailed gravity audit, which included the ore, cyclone classification, Knelson concentrators, and the Consep Acacia intensive leach system. The deeper ores contain significant pyrrhotite, and this created some unusual challenges that had to be overcome. This paper presents the gravity circuit design process, the circuit commissioning, and the audit results and ongoing improvements.

NOTES:

21:00 CHAIR'S RECEPTION – GOVERNOR GENERAL BALLROOM

CMP 2018 – ABSTRACTS

08:55 – PAPER 12

SART Implementation at Heap Leach Operations in Mexico

D. Kratochvil – BQE Water

D. Salari – D.E.N.M. Engineering Ltd.

T. Avilez - M Metallōrum Mēxico

The economics of developing gold deposits containing elevated levels of cyanide soluble base metals is often challenged by high cyanide consumption and increased operating costs. SART is a chemical process that enables cyanide consumed by base metals to be recovered and recycled for gold leaching. The process also provides concurrent recovery of the base metal to generate incremental revenue from the sale of high-grade base metal sulphide concentrates. Although SART was developed and successfully piloted by Lakefield Research and Teck Corporation in the late 90's and is now a public domain technology, the adoption of SART has been relatively slow due to concerns about implementation costs and the reliability of metallurgical performance. Through extensive experience in selective metal sulphide precipitation applied to mining wastewater since 2007, BQE Water has provided process know-how, design along with operations and maintenance experience to a number of projects involving the integration of SART into various metallurgical flowsheets on an industrial scale. This paper presents the commissioning experience and operating data from a SART plant treating up to 500 m³/hr of leach solution at a heap leach operation in Mexico

NOTES:

9:20 – PAPER 13

Carbon Scout – Automating Carbon Measurement and Control in CIP/CIL Circuits

G. Rasmussen and W.P Staunton – Gekko Systems

W. Lodge – Gold Technology Group

The carbon-in-pulp (CIP) process has been the dominant gold recovery technology since the 1980s. During all this time carbon measurement, and control of the carbon transfer pumps has been largely manual in nature. Such manual operation inevitably limits process efficiency, potentially resulting in higher gold solution losses, and higher cost of circuit operation. Based on the authors' experience, average plant solution loss is in the range of 0.02-0.03 ppm Au, as opposed to the general industry target of 0.01 ppm Au or less. Gekko Systems, in conjunction with Curtin University's Gold Technology Group, has developed a carbon concentration meter, the 'Carbon Scout' meter. The meter automatically measures carbon concentration in all tanks, providing more frequent and more precise data. Combined with SIMCIL, a CIP circuit process model which is used to determine the optimum set points for the circuit, the meter should ensure lower gold solution losses, and more efficient operation of the carbon circuit. This paper will review they critical factors for good carbon management, the development of the meter and results from the first plant installation. Additional benefits of the Carbon Scout, including improved health and safety and the opportunity to measure other key variables in the leach/adsorption circuit from one central location will also be described.

NOTES:

09:45 – BREAK – PROVINCES BALLROOM

CMP 2018 – ABSTRACTS

10:15 - PAPER 14

Organic Carbon Mitigation at Peñasquito

*P.J. Lind and M.A. Tomlinson – Goldcorp Inc.
J. Awmack – Goldcorp Peñasquito Mine*

Peñasquito is a complex polymetallic deposit containing gold, silver, lead, zinc, and copper and is one of the largest producers of gold in Mexico. Mining activity is currently transitioning to a second open pit, Chile Colorado, which will be mined concurrently with the existing open pit, Peñasco. The ore bodies are located within diatreme pipes and into the surrounding sediment formation. In the coming years, mining will be carried out in more sedimentary zones, which are significantly higher in organic carbon content. Organic carbon in the feed influences both flotation and leaching operations.

Several changes are being implemented to the Peñasquito flowsheet to mitigate the effects of increased organic carbon in the plant feed. These include the use of alternate reagent schemes, construction of a carbon pre-flotation circuit, implementation of a pre-leach flotation circuit ahead of pyrite leach, and evaluation of a tertiary process for separation of carbon and precious metal minerals.

NOTES:

10:40 - PAPER 15

Optimizing the Carbon Circuit at the Young-Davidson Mine using CIP/CIL Modelling

T. Crary, C.A. Fleming, and M. Ounpuu – SGS Canada Inc.

P. MacPhail – Consulting Metallurgist

M. Tiedtke – Alamos Gold Inc.

The SGS carbon-in-pulp (CIP) / carbon-in-leach (CIL) model was used to evaluate and optimize the carbon circuit at Alamos Gold's Young-Davidson Mine. Plants samples (pulp and carbon) were tested in a series of small scale batch experiments to determine rates of gold leaching and adsorption on carbon from a combined flotation concentrate/tailing product. The testwork data, along with existing plant data were then used to model the performance of the existing CIL plant and optimize the circuit to improve performance and overall recovery. The primary purpose of the modelling exercise was to determine the most cost effective way to lower solution losses at the plant. The modelling was also used to learn how the various parameters in the CIL circuit affect solution losses and the gold inventory tied up on the carbon. This resulted in recommendations for minor changes in the CIL flowsheet, which were successfully implemented in the plant. The approach, results and plant changes are presented

NOTES:

11:05 – PAPER 16

Best-practice Considerations for Bullion Handling
Z. Yamak and M. Somppi – Goldcorp Inc.

Gold producers invest significant effort in mining, processing, and creating an intermediate gold doré product. Nonetheless, equal effort should be extended to the final handling and processing of the doré bar, and managing the high-purity gold produced at the fine-gold toll refiner. This detailed attention to bullion handling and refining provides rigor and confidence that the mine site is achieving, through fair and controlled methodology, the most appropriate value for the final product. With the above in mind, the following study explores the importance of preparing a set of site best-practices for bullion handling and specifically, detailing the peculiarities of sampling methodologies and the impact on assays.

NOTES:

11:30 ABM LUNCH – GOVERNOR GENERAL BALLROOM

WEDNESDAY, JANUARY 24th
Afternoon Session

13:00 – PAPER 17

Sustainable Comminution? Giving Mining Clients What They Need, Expect and Deserve
J. Starkey – Starkey & Associates Inc.

A comminution circuit in recent history, is one of the most difficult parts of a mineral processing plant to design with confidence. It is usually the most costly part of a plant to build, and it can consume up to half or more of the energy used on a mine site. To suggest that comminution energy usage is sustainable in the long term is not possible at this time. What we have to choose from today, based on more than 50 years of experience, does include the best available technology, and the best way to design it. There is controversy in the industry as to how to properly approach the subject of comminution design, with many of the optional solutions requiring a level of training and expertise beyond the ability of a non-specialist engineer. Semi-autogenous grinding technology in particular, has not been properly appreciated because of many recent mistakes in its application and design, which have blurred the positive perception about what SAG technology is, how it can be used, and how it needs to be designed and built. In order to change this, mine owners and senior managers need to take responsibility for, and learn to understand the fundamental challenges that a comminution circuit poses to the project, to the design process, to the operators who use the equipment, and to the resulting metallurgy. This address is intended to summarize these challenges and offer fundamental engineering solutions, which are clear, specific and in a format which is directly applicable to the mining and mineral engineering community.

NOTES:

CMP 2018 – ABSTRACTS

13:40 – PAPER 18

Simulation for Ball Mill Sizing: The Path to a Successful Plant Start-up

*A. Berton and H. Gilbert-Tremblay – Soutex
A. Rousselet – Ressources Robex*

Robex Resources interrupted production at the Nampala Mine in September 2014 following throughput and gold recovery results which were below expectations during the first months of operation. After a thorough plant audit, an important brainstorming took place in order to identify an economical path to resume production. It was clearly identified that a significant investment was necessary at the concentrator prior to restarting the plant, namely the addition of a ball mill and a new elution system.

The mineral processing simulation software USIM PAC was used in order to simulate the grinding circuit in design. The simulations' outputs allowed the ball mill characteristics and the surrounding classification devices to be designed with more accuracy. Many ball mills available from second hand retailers were therefore studied in the simulated circuit. The chosen ball mill, which was in perfect condition, had the advantage of being available for rapid delivery on site.

The paper first describes the ball mill sizing method in comparison with the conventional Allis Chalmers method. It then describes the phase 2 concentrator start-up (that took place in 2016) with the commissioning of the ball mill, the classification circuit, the gravity concentration, the four (4) new carbon-in-leach (CIL) tanks, and the Zadra elution system (The phase 1 start-up took place in 2014). It finally provides production data compared to expected simulation data, as commercial production was reached in January 2017.

NOTES:

14:05 – PAPER 19

Multi Stage HPGR Circuits – Increasing the Benefit Across the Comminution Flow Sheet

F.P. van der Meer – WEIR Venlo

HPGRs operate in a wide array of applications in mining and minerals. These range from relatively coarse crushing of copper and gold ores at one end of the spectrum to the processing of fine iron ore pellet feed and fine industrial mineral products at the other. Traditionally these circuits involve the treatment of relatively moist materials in pre-grinding circuits; using single stage HPGRs in open circuit or as a closed circuit operation with screening or partial product recycle. More recently, HPGR is increasingly deployed in dry grinding in combination with air classification.

The high throughput demonstrated by larger HPGRs has stretched the application towards coarser size reduction duties for a number of new projects. At the same time, the basic principle of inter-particle crushing for generating a product with a high fines proportion gives ground to investigate applying the technology further towards finished product duties.

The advantages that HPGR brings are clear. Multi Stage grinding enables energy efficient size reduction across more of the comminution circuit. Primary HPGR serves for a coarse grinding duty, whereas a secondary HPGR is geared towards generating a fine product for downstream processing or even a finished product.

This publication summarizes some of the features of staged HPGR circuits and discusses some examples of operating and projected applications.

NOTES:

CMP 2018 – ABSTRACTS

14:35 – PAPER 20

Canada Fluorspar (NL) Inc. St. Lawrence Fluorspar Project – Flowsheet Development

*E. Legault-Seguin – SGS Canada Inc
M. Stogran-Baker – Canada Fluorspar (NL) Inc.*

Fluorspar mining in the St. Lawrence area of Newfoundland and Labrador began in the 1930s and ended in the mid-1980s. In 2013, Canada Fluorspar (NL) Inc (CFI) discovered a new ore body, the AGS vein, which proved amenable to more economic open pit mining methods and began developing this resource.

This paper discusses the flowsheet development of the AGS vein deposit. Testing at SGS began in 2009 with samples from other deposits in the area. The testwork included pilot-scale dense medium separation (DMS), laboratory-scale flotation tests to develop the flowsheet and a flotation pilot plant. The more recent work that is presented here has been devoted to the AGS vein, and included a variability testing program that gave tremendous insight into the metallurgical drivers of processing the deposit.

The ore was found to be fairly variable in terms of fluorite grade, but also gangue mineralogy, which had greater implications on the DMS performance. The gangue mineralogy was also found to significantly impact the grindability characteristics of the DMS product.

This paper will detail the testing conducted and the mitigating steps which were identified for the operation.

NOTES:

15:30 – PAPER 21

Pyrrhotite Rejection at the Strathcona Mill

*R. Multani, G. Marrs, M. Muinonen, and
D. Fragomeni – XPS
C. Deredin and J. Coffin- Glencore Sudbury
Integrated Nickel Operations
V. Lawson – Glencore Technology*

Rejection of pyrrhotite from pentlandite is of critical importance to the economics of nickel concentrate production and the main goal of the Strathcona milling operations. A joint team of XPS, Glencore Technology and Strathcona Mill personnel executed a comprehensive program of work to develop and implement strategies for increased Po rejection with focus on challenging ores containing high feed Po/Pn ratios (> 7) and significant hexagonal Po content ($> 40\%$ of total Po). This paper describes the team results including minerology, bench-scale flotation tests, and plant validation tests and modeling that have defined the path forward to improving the metallurgical performance and economics of the mill operation. Techniques to quantify hexagonal and monoclinic pyrrhotites were developed at XPS to assess the differences in their metallurgical behavior since their flotation responses are quite different. Mineralogical tools including QEMScan were extensively used to determine mineral liberation, associations, optimum grind size, and nickel deportment into pentlandite, pyrrhotite and non-sulphide gangue. Several reagents/strategies were evaluated during bench-scale flotation testing to significantly increase Po rejection. A significant shift in the Po-Pn selectivity and grade recovery curves was achieved using several strategies including the use of DETA and sodium metabisulfite, and regrind of the rougher concentrate and rougher cleaner/rougher tails.

NOTES:

15:00 BREAK – PROVINCES BALLROOM

CMP 2018 – ABSTRACTS

15:55 – PAPER 22

Advanced Iron Endpoint Control During Nickel/Copper Matte Converting: A Techno-economic Analysis Study

C.P. Baxter and A. Plugatyr – National Research Council of Canada

Bessemer matte iron content is a critical process parameter that needs to be closely monitored and controlled in order to achieve optimal Ni/Cu smelter returns. Current process control practices during Ni/Cu converting often rely on visual observations and typically involve matte sampling to confirm that target composition was reached. A high-level techno-economic analysis study was carried out to evaluate potential direct benefits of advanced process control during the final stages of Ni/Cu matte converting. The results indicate that the magnitude of direct benefits will largely depend on matte iron control practices already implemented as well as matte iron set point. Preliminary assessment suggests that under the assumptions used in this study, implementation of advanced process control can potentially result in additional revenues ranging from several hundreds of thousands to tens of millions of US dollars per year per converter producing about 200 tonnes of Bessemer matte per day based on Ni, Cu, and Co metal recoveries alone.

NOTES:

16:20 – PAPER 23

Benchmarking Performance of the Two-Stage StackCell™ with Conventional Flotation for Copper Sulfide Applications

*E. Wasmund and L. Christodoulou – Eriez Flotation Division Canada
M. Mankosa and E. Yan – Eriez Manufacturing*

Rougher flotation in sulfide ore applications is typically performed using conventional flotation machines. The trend over the last 100 years has been for these cells to become larger in volume with cells reaching sizes of 600 m³ and in some cases even larger. The associated foundation loadings, transport and installation requirements along with building size have also increased. In an economic environment where projects must be executed with dwindling capital supply, bigger is not always better. More recently, industry is being challenged to identify new technology that allows for improved flowsheets and financial returns through efficiency gains. To meet this challenge, a novel high-intensity two-stage flotation system known as the StackCell™ was tested to potentially achieve installation volume and required retention time gains when compared to conventional flotation circuits. The results from on-site pilot scale work conducted on typical copper concentrator rougher flotation feed showed retention time gains on the order of 6 to 9 times when compared with conventional flotation equipment. This finding has the potential of reducing capital demands for rougher flotation circuit designs when incorporating the StackCell. The results from test work will be discussed in this paper showing comparative test data generated with a Denver bench batch test, pilot StackCell and large conventional cells, all receiving the same feed.

NOTES:

6:30 BANQUET RECEPTION – BALLROOM FOYER

7:30 BANQUET – CONFEDERATION BALLROOM

**THURSDAY, JANUARY 25th
Morning Session**

07:30 - CONTINENTAL BREAKFAST – PROVINCES BALLROOM

8:30 – PAPER 24

Yamana Chapada’s Optimisation of a Copper/Gold Plant

*F.C.F. Batista, R.de S. Almeida, L.de Á. Silva, and T. Banerjee – Yamana Gold Chapada
D. Gudgeon – Woodgrove Technologies*

Yamana Chapada’s mine is one of the larger copper-gold mines in Brazil. The mine is located in Goiás state, in the central part of Brazil. The mine has estimated Mineral Reserves of 4.1 million ounces of gold and 3.2 billion pounds of copper as of December 31, 2016. While gold and silver are significant, Chapada’s process flowsheet is configured closer to that of copper facilities. This includes a SAG/Ball configuration for grinding followed by flotation. In the case of Chapada, the mineralogy results in higher-than-normal complexity, notably a significant circulating load both in the grinding and flotation circuits. From an operating perspective, the complexities are controllable, but require careful attention to ensure that circulating loads are effectively managed and gold is not lost to tailings. Chapada created an automation roadmap in 2016 designed to increase plant performance (tonnage, recovery and efficiency). Based on strong potential, the project was fast tracked and within 4 months instruments were installed, control algorithms implemented, and training sessions took place to ensure sustainability at site. This paper will follow the Chapada journey from identifying the opportunities through to implementation and testing.

NOTES:

8:55 - PAPER 25

Evaluation of Cave-to-mill Opportunities at the New Afton Mine

*S. Nadolski, B. Klein, and D. Elmo – NBK Institute of Mining Engineering
M. Samuels – New Gold Inc
C.J.R. Hart – MDRU-Mineral Deposit Research Unit*

Block and panel cave mining methods are being increasingly proposed as they allow massive, deeply situated ore-bodies to be mined economically at a time when discovery rates of significant near surface deposits are declining. Cave-to-Mill, a mine-to-mill approach for block cave mines, defines ore block models with respect to both mine and mill performance. A cave-to-mill study for the New Afton block caving operation focused on identifying value opportunities related to fragmentation and sorting for a future lift as development progresses deeper. The lack of selectivity and potential for dilution associated with the block cave mining method results in many caving operations having to mine and either dispose of or process material that is below cut-off grade at certain stages of production.

As an outcome of the study, the variation in cave fragmentation size and the sensitivity of mill throughput to feed size was examined. To evaluate the amenability of bulk and particle sorting, Prompt Gamma Neutron Activation Analysis and X-Ray Fluorescence sensors were tested. A conceptual bulk and particle sorting flowsheet is presented. Grade data from regular underground sampling was used to predict the performance of a bulk sorter. A heterogeneity analysis of material reporting to drawpoints helped to identify areas of the extraction level that experience high variations in grade and thereby stand to benefit from dedicated ore and waste material handling systems should underground bulk sorting be implemented

NOTES:

CMP 2018 – ABSTRACTS

09:20 – PAPER 26

Canada Fluorspar (NL) Inc. St. Lawrence Fluorspar Project – Project Description

M.A. Stogran-Baker and S. Cole – Canada Fluorspar (NL) Inc.

Fluorspar mining occurred in the St. Lawrence area from the 1930s until the mid 1980s. In 2013, CFI discovered a new ore body, the AGS vein, which proved amenable to more economic open pit mining methods. A new mill was designed to produce 200,000 tonnes per year of high quality, acid-grade fluorspar concentrate. The simple mill flowsheet includes crushing, dense medium separation (DMS), grinding, sulphide flotation, pulp thickening, fluorite flotation, thickening, and concentrate filtration. The type of flotation cell used is being installed for the first time in North America. Site clearing commenced in the spring of 2016, followed by mill building erection completed by the fall of the same year. Civil and mechanical installation as well as site-wide construction was completed by the end of September 2017. Commissioning commenced, and at the time of paper submission mill production is on track to ramp up to full capacity by the beginning of 2018. This paper will focus on the use of fluorine NMR analysis applied to fluorite and the development of on-stream analysis, flotation cell selection and the decision to install the new cells, and the water control program designed to maintain process control with the least possible environmental impact.

NOTES:

10:15 – PAPER 27

Silica Removal from Uranium Process Streams by Polyethylene Glycol Coagulation

L. Verhelst and B. Dyck – Cameco Key Lake Operations

Colloidal silica in Key Lake's Solvent Extraction (SX) feed solutions has presented an operational problem for the mill throughout its history. The colloidal silica stabilizes aqueous continuous emulsions, resulting in elevated solvent losses and operational downtime. Through the years, many attempts have been made to solve this problem, but no viable solutions were found. By revisiting an idea dating back to the 1979 feasibility study and re-evaluating it under current operating conditions, a practical solution was achieved.

This paper discusses Key Lake's history around colloidal silica removal, starting with coagulation using a polyethylene oxide polymer (PEO), and ending with coagulation using a polyethylene glycol (PEG) polymer. The results of a mill trial using POLYSIL® RM1250 introduced at doses up to 300 ppm into the counter current decantation (CCD) circuit to clarify SX feed solutions are discussed with a focus on the benefits to SX.

NOTES:

09:45 BREAK – PROVINCES BALLROOM

CMP 2018 – ABSTRACTS

10:40 – PAPER 28

Evaluation of On-line Particle Size Distribution Measurement for Oil Sands Tailings Treatment

*D. Schwartz, B. Komishke, and R. Heffel – Teck Resources Limited
L. Koresaar – Outotec (Finland) OY
E. Sharifi – Outotec (Canada) Ltd.*

The oil sands resources in Canada are one of the world's largest hydrocarbon deposits. Processing of oil sands uses hot water to extract bitumen. The process generates tailings slurry that must be settled for final deposition. The tailings contain fine material, with poor water release characteristics which makes water recovery challenging. Polymer flocculants are added to assist in settling and dewatering the fine tailings. The amount of polymer addition is dependent on tailings characteristics, including the particle size distribution (PSD). If the PSD of the tailings is unknown, an excess amount of polymer needs to be added in the dewatering stage to flocculate the particles. Over flocculation also has a detrimental effect on the water release characteristics.

Measuring the particle size distribution using an on-line analyzer could have major benefits over common laboratory methods as it provides online and fast insight into the process enabling the operators to implement required changes to minimize the reagent consumption, while achieving optimal flocculation. Online measurement of PSD using laser diffraction has long been used in base metals beneficiation processes. A series of test work using Outotec PSI500® particle size analyzer on oil sands samples from different operations have been conducted. Tests were performed by recirculating the slurry in closed circuit to simulate real plant conditions. This paper presents a summary of the results.

NOTES:

11:05 – PAPER 29

APC at LaRonde: The Progressive Control Approach

*Y. Dumais and R. Lemire – Agnico Eagle LaRonde
T. Banerjee and H. Weitz – Woodgrove Technologies*

Agnico Eagle LaRonde produces over 300,000 ounces of gold annually, along with silver, zinc and copper by-products. The LaRonde plant consists of a conventional SAG and Ball mill circuit, followed by flotation. Load management is imperative for maintaining stability in grind size and ensuring consistency of the flotation feed. In flotation, the mass pull profiles of the cells and reagent dosage rates need to be managed to maximize recovery, while maintaining product quality. This is achieved by controlling the air, level and reagent addition set-points across the circuit. However, disturbances such as feed size distribution, ore hardness and mineralogy make it challenging to maintain efficient control using traditional control techniques. LaRonde therefore worked to develop a progressive control strategy, targeting stability and optimization. This started with a year-long instrumentation upgrade campaign, focusing on optimizing the performance and reliability of plant-wide instrumentation. The process was then optimized, leveraging AwaRE advanced controllers running in closed loop with PARC modules embedded within the PLC. The installation of 8 PFC cameras in flotation changed the flotation operation from a level and air control based strategy, to one that controls mass pull. This new control philosophy has allowed the plant to effectively manage mill load, improving grind size and providing increased throughput with better flotation performance.

NOTES:

11:30 – LUNCH BREAK (not provided)

THURSDAY, JANUARY 25th
Afternoon Session

13:00 – PAPER 30

Evaluating the Effects of Sensor Based Sorting on Lithium Processing and Mine Economics using Advanced Process Simulation Software

*J. Rohleder, A. Remes, and M. Talikka – Outotec (Finland) Oy
M. Myllymäki and P. Lamberg – Keliber Oy*

Pre-treatment of mill feed in a minerals processing plant enables for higher production efficiency per ton of product, reduction of consumables and diverting mineral feed types. Sensor based particle sorting allows for pre-concentration of the run-of-mine (ROM) material prior to other concentrating process. Various sensors provide different responses from the minerals in measured particles. The capability of “accepting” or “rejecting” particles based on sensor responses is investigated in specific test work for each project. Modern sorting machines use pneumatic actuators to divert the reject particles from the material stream.

This paper discusses the incorporation of ore sorting test work in processing and plant design. When taking the effects of a sorting circuit into account early in the process planning phase, the downstream process can be adequately sized and impacts evaluated. Potential benefits include but are not limited to increased head grade, lower tonnage to the mill, increased mining operations, removal of deleterious elements and changed properties in the process feed.

In a case study we present the Keliber lithium project in central Finland. The plant will produce 9000 tons of lithium carbonate per year from a spodumene ore. Ore sorting and flotation tests were carried out in laboratory and pilot scale. Process models were designed and simulations performed using Outotec’s HSC Chemistry Simulation software. Changes in the flotation performance (grade, recovery, impurity levels) were simulated with and without the pre-concentration of the ROM material. The metallurgical performance and mine economics of the different operational scenarios were evaluated using the Ore-Met optimizer module of the simulation software.

NOTES:

13:25 – PAPER 31

Ore Pre-concentration by Bulk Sorting using Real Time Elemental Analysis

H. Kurth and L. Balzan – Scantech International Pty Ltd

Conveyed coal flows have been diverted on the basis of real time ash analysis since the 1980s. Many coarse particle separation methods are available through screens, jigs, heavy media separation, particle sorters, to name a few, however bulk diversion requires a representative, continuous analysis to ensure diversion decisions can be made with confidence. Sensors also need to be able to provide measurements at useful time increments so that small tonnages can be diverted for maximum selectivity. Particle separation typically requires high capital costs and there are limitations either in throughput tonnage or particle size or both. Few techniques are able to provide robust and representative analysis of conveyed flows in a useful time basis. Prompt Gamma Neutron Activation Analysis provides multi-elemental analysis of conveyed bulk materials and has been proven in the minerals industry since 2003. This paper outlines the success of this technology in minerals applications in iron ore, phosphate rock and most recently in copper-gold ores, including its use in bulk diversion.

NOTES:

CMP 2018 – ABSTRACTS

13:50 – PAPER 32

Waste to Ore: A Goldcorp Story

K. Murray, T. Ward, and K. Shah – Goldcorp Inc.

The mining industry is processing deposits with ever decreasing grade at ever increasing operating costs while margins are under constant pressure by material substitution and recycling. We are reaching the point where building it bigger just isn't good enough as social and environmental constraints become more intense. In response to the growing demands on our industry, Goldcorp has embarked on a journey to increase resources by converting Waste to Ore. Gravity pre-concentration and sensor sorting testwork has been completed on samples from our Canadian operations in order to determine the amenability of our mineralized waste to sorting and upgrading. As expected some material was amenable to sorting and a review of the economics supported demonstration plant testing. The ability to economically sort mineralized waste into ore and barren rock is being demonstrated by Goldcorp. It has been made possible by leveraging the experience mineral sizer manufacturers have gained in the oil sands and hard rock applications, seeking more energy efficient screening machines and embracing the advancements that ore and recycling sorter suppliers have achieved. The paper will discuss the testwork and results achieved to date from both the lab and demonstration plant.

NOTES:

14:15 – PAPER 33

The Premise of Profit Recovery™ and Applied Ore Sorting Examples

B. Hilscher and C. Tong - Sacré-Davey Engineering

Sensor based ore sorting is being rapidly adopted by the mining industry. The ability to boost mill feed grade by rejecting waste grade rocks early in the process has proven revolutionary for some operations.

This paper briefly reviews the current position of ore sorting in the industry, as well as abridged results from specific operations such as Barrick, McEwen, New Gold, and two others. The paper also introduces the concept of "Profit Recovery™", the measuring of recovery based on rock profitability rather than just metal content.

NOTES:

14:40 PRE-PANEL RECEPTION – PROVINCES BALLROOM

15:15 – Panel Discussion

Ore Sorting; Will Sorting Provide the Gains Expected in Grinding and Energy Efficiency

Panelists: Kevin Murray, Goldcorp, Johnna Muinonen, RNC Minerals, Brent Hischer, Sacre-Davey, Harold Klein, Scantech, Lutke von Ketelhodt, Steinert US, Paul Staples, Ausenco, Bern Klein, University of British Columbia, Andrew Bamber, MineSense
Moderator: Paul Blatter

NOTES:

**CALL FOR PAPERS
CMP 2019**



51st Annual Canadian Mineral Processors Operators Conference

January 22 to 24, 2019

Westin Hotel, Ottawa, Canada

The Canadian Mineral Processors Conference is one of the world's premier operators' conferences with a distinguished history of providing a fertile venue for the exchange of ideas on all aspects of mineral processing.

Please submit technical papers from the full spectrum of subjects in mineral processing for all commodities. We are specifically soliciting papers from new and operating plants describing plant design, start-ups and improvements, application of new technologies, ore characterization and process mineralogy in optimization and design, precious metals recovery, tailings handling and management.

Please submit a ~200 word abstract for consideration before **June 15th, 2018** to:

Stéfanie Vo, 1st Vice Chair CMP2018
stefanie.vo@hatch.com

Your notice of acceptance will be granted on or before August 1st, 2018.

Authors selected will be required to produce a written paper by Oct 6, 2018 and present a twenty-minute technical presentation to the conference.

**16:15 CLOSING RECEPTION
CONFEDERATION FOYER**

17:30 CONFERENCE CONCLUDES

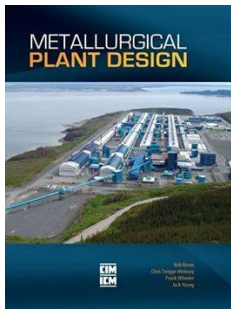
CMP 2018 – AUTHORS, PUBLICATIONS, CMP SPONSORED STUDENTS

CMP PUBLICATIONS

Past proceedings, compilation proceedings on CD, and other mineral processing related books are available for purchase at the registration desk. CMP is in the process of transferring all past proceedings papers to OneMine. Free to access with your CIM membership.



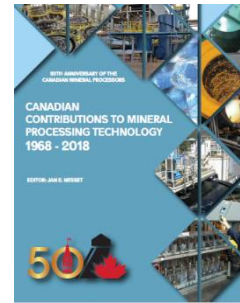
METALLURGICAL PLANT DESIGN



Great reference book the design process of a properly functioning metallurgical facility. This book fills the information gap.

Available at the registration desk

50th ANNIVERSARY OF THE CMP



The CMP 50th Anniversary is commemorated by this volume, which highlights Canadian contributions to mineral processing technology over the past 50 year. As much as possible, the stories have been written by those individuals closely involved with these developments, include environmental, and water management, innovative technologies, innovations in operations, technology providers and universities that have conducted research of significance to our industry. The book is provided to all delegates. Extra copies can be purchased for \$55 (+ tax).

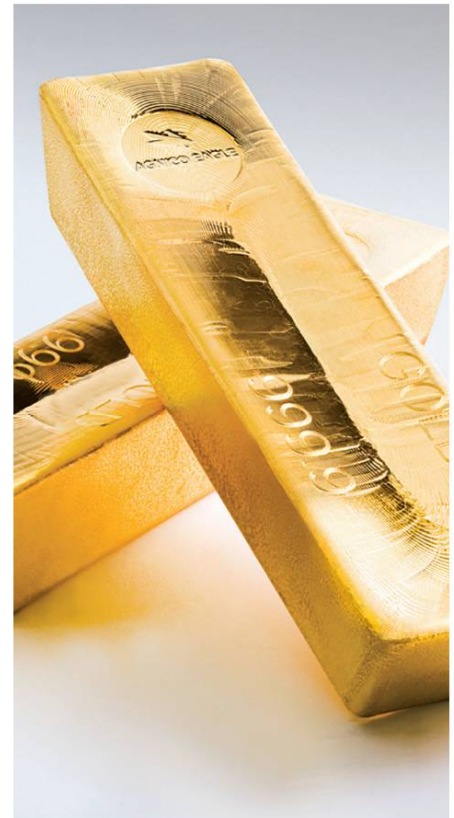


AGNICO EAGLE

Agnico Eagle congratulates the Canadian Mineral Processors on their 50th Annual Conference.

Agnico Eagle souhaite féliciter les Minéralurgistes du Canada pour leur 50^{ème} conférence annuelle.

CONGRATULATIONS | FÉLICITATIONS | FELICITACIONES | ONNEA



CMP 2018 – AUTHORS, PUBLICATIONS, CMP SPONSORED STUDENTS

**CMP 2018
SPONSORED STUDENTS* AND
STUDENT AWARD WINNERS**

School/Award	Student(s)
CEGEP de L'Abitibi-Temiscamingue	Tani Tho Nicolas Royer
University of Alberta	Vitalii Dodonov
British Columbia Institute of Technology	Cameron Weatherhead Carlos Martinez
University of British Columbia	<i>Names not available at the time of printing</i>
Cambrian College	Stephany Saroka Umang Grover
Dalhousie University	Megan Magie Angus MacDonald
Haileybury School of Mines, Northern College	Krisma Charlton Phillip Manseau
Lakehead University	Kyle Watkins Quinten Ilkka
Laurentian University	Alexandre Drolet Ryan Ayerst
Université Laval	Léa Ebacher
McGill University	Hillary Williams Chan Woo (Robin) Jeong
Memorial University	<i>Names not available at the time of printing</i>
Queen's University	Rachel Watts Connor Large
University of Saskatchewan	Tom Specht Austin Legacy
CEGEP Sept-Iles	Corine Simard Marc-André Ringuet
CEGEP de Thetford	Marie Cloutier Jean Nicolas Tremblay
University of Toronto	<i>Names not available at the time of printing</i>
Technical Report Winner	Bailee .M. Johnson
Andre Laplante Scholarship Winner	Alex Thivierge
Byron Knelson Scholarship Winner	Douglas Kao

* Our gracious sponsors (see back cover) provide the funding necessary to send two students from each of the Canadian mineral processing colleges and universities to the annual Canadian Mineral Processors conference all expenses paid

CMP 2017/18 – EXECUTIVE, REGIONAL and COMMITTEE REPRESENTATIVES

CMP EXECUTIVE

Chair	Johnna Muinonen, RNC Minerals, jmuinonen@rncminerals.com
1 st Vice-Chair	Brian Danyliw, ChemTreat, briand@chemtreat.com
2 nd Vice-Chair	Stéfanie Vo, Hatch, stefanie.vo@hatch.com
Past Chair	Scott Martin, Progressive Rubber Industries, scott@progressiverubber.com
Secretary	Rory Cameron, CanmetMINING, rory.cameron@canada.ca
Treasurer	Wesley Griffith, CanmetMINING, wesley.griffith@canada.ca

REGIONAL REPRESENTATIVES

Atlantic – Vacant	
Côte Nord-Labrador	- François Lavoie, Québec Iron Ore, flavoie@mineralferquebec.com
Quebec-Montreal-Ottawa	– Caroline Voilleau, Soutex, cvoilleau@soutex.ca
North Eastern Ontario	– Tim Edwards, Glencore, tim.edwards@glencore-ca.com
Southern Ontario (Toronto)	- Rob Raponi, TR Raponi Consulting Ltd., robert.raponi@bell.net
North Western Ontario	- CCC Chemicals, mmartin@flochem.com
Central Ontario	- Andrew Taylor, Vale, andrew.taylor@vale.com
Manitoba / Saskatchewan	- Lorne Schwartz, Wood PLC, lorne.schwartz@woodplc.com
Alberta/NWT/Nunavut	- Dragan Pejic, Stellar Engineering Inc., dragan.pejic@cmpabnwtu.ca
British Columbia/Yukon	– Irma Gabric Burk, Thermo Fisher, irma.gabric@thermofisher.com
Regional Coordinator	- Donald Leroux, Woodgrove Technologies, donleroux@woodgrovetech.com

DIRECTORS

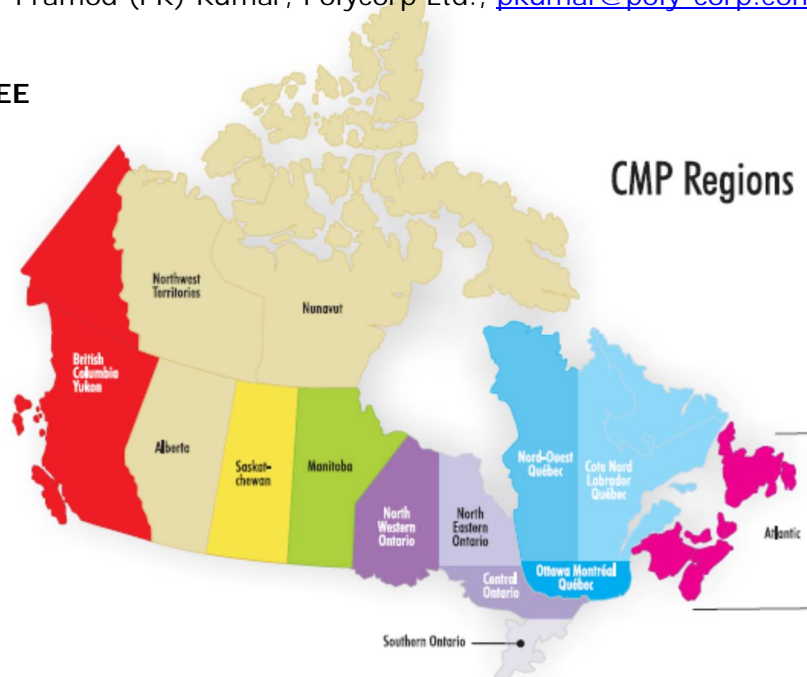
John Starkey, Stuart McTavish, Ernie Marcotte, Paul Blatter

REPRESENTATION ON CIM and CMP COMMITTEES

CIM Council Representative	Pierre Julien, DRA, pierre.julien@draglobal.com
Publications/Technical Journal	Michael Sue, Outotec, michael.sue@outotec.com
Education	René del Villar, Laval, Rene.DelVillar@gmn.ulaval.ca
International Relations	Pramod (PK) Kumar, Polycorp Ltd., pkumar@poly-corp.com

LOCAL ORGANIZING COMMITTEE

Carlyn Attwell
Rory Cameron
John Chaulk, Audio-Visual
Wesley Griffith, Registrar
Dave Hardy, Students
Al Kuiper, Photography
Louise Madaire
Janice Zinck, Planner



CMP 2018 – HOCKEY, SQUASH AND RUNNING

CMP SQUASH AND RUNNING CLUBS

In addition to the 'Ray MacDonald Memorial Hockey Game' CMP delegates can also remain physically active by participating in the CMP squash club by contacting Berge Simonian bsimonian@tcrk.com or take part in the Wednesday morning Rideau Canal run -contact Stéfanie Vo stefanie.vo@hatch.com.



CMP HOCKEY PLAYERS AND SPECTATORS!!!!

The Southern Ontario Branch of the Canadian Mineral Processors (CMP) is pleased to once again organize the CMP East versus West Hockey Game as a part of the social program of the annual CMP meeting in Ottawa.



To honour the late Ray MacDonald, who was instrumental in getting this annual event started, the game has been renamed the '**Ray MacDonald Memorial Hockey Game**'. The winning team will be awarded the 'Kilborn Cup'.

The 2018 game will be played on **Tuesday January 23rd, 2018 at 6:00 pm at Carleton University**. Bus transportation to/from the Ottawa Westin Hotel will be provided for all players and spectators. The bus for players and spectators will depart the Westin hotel at 4:30 pm.

The hockey game is open to all registered members of the conference. Players (men and women) of all ages and skill levels are encouraged to participate in this great event of networking, recreation, and fun. Full hockey equipment including a helmet is required. Participants will also be required to sign a waiver form. Slap shots and body contact are not permitted. If interested in participating in this game, please contact Mark Griffiths at mark_griffiths@quadra.ca (289-321-1814).



Real Experts. Real Results.

CMP 2018 - AWARDS AND AUTHORS

CMP 2018 AWARDS NOMINATION INVITATION

The Executive of the Canadian Mineral Processors Society invites nominations from the membership for the CMP 2018 Awards under the following five categories.

CMP Award	Recognizing ...
Mineral Processor of the Year	Outstanding results recently achieved by an active CMP member while <i>tackling significant mineral processing challenges.</i>
Lifetime Achievement	Outstanding results/influence achieved by a retired CMP member <i>throughout his/her career</i> in mineral processing.
Bill Moore Special Achievement	Outstanding results achieved by an active CMP member throughout <i>the early part of his/her career</i> in mineral processing.
A.R. MacPherson Comminution	Outstanding results recently achieved by an active CMP member <i>while tackling comminution challenges</i> in mineral processing plants.
Ray MacDonald Volunteer	<i>Exceptional volunteer contribution</i> to the Canadian Mineral Processors Society

Awards are in the form of an engraved medallion and a framed certificate and will be presented during the Awards Banquet on Wednesday evening.

Nominations for the 2019 CMP awards open on January 25, 2018. Nomination applications should be sent to Johnna Muinonen, jmuinonen@rncminerals.com CMP Past Chair (2019) by November 15, 2018.

Guidelines for nominations, award categories, selection criteria, and information on past awards are available at www.cmpsoc.ca. Please take the time to recognize your mineral processing colleagues and peers.



Don't miss Extraction 2018—a new opportunity to gather with your colleagues in the global extractive metallurgy community. This conference will serve as the host for several important recurring symposia in the field, while also offering new programming tracks, an exploration of marketplace and business issues, a slate of social and networking events, and an industrial exhibition.

PLANT TO ATTEND: REGISTRATION OPENS SOON!
www.ExtractionMeeting.org

TECHNICAL THEMES AND SYMPOSIA

HYDROMETALLURGY

- Hydrometallurgy 2018
- Gordon Ritcey Symposium: Advances in Hydrometallurgical Solution Purification Separations
- Processing of Critical Metals

PYROMETALLURGY

- 7th International Symposium on Advances in Sulfide Smelting
- Peter Hayes Symposium on Pyrometallurgical Processing

SULFIDE FLOTATION

EXTRACTIVE METALLURGY MARKETS AND ECONOMICS

BENEFIT YOUR BUSINESS: EXHIBIT AT EXTRACTION 2018

Space is limited! Visit www.ExtractionMeeting.org for details and to reserve your spot.

Organized by the Metallurgical Award Society of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) for Society for Mining, Metallurgy & Exploration (SME) and the Minerals, Metals & Materials Society (TMS)

AUTHORS AND SESSION CHAIRS

Authors and session chairs must register as conference delegates. A speaker's breakfast will be provided starting at 7:00 am on the day of their presentation/session in the **Quebec Room**. Authors, please contact John Chaulk john.chaulk@canada.ca for presentation information.

Premier Partners

Since 2004, Wheaton Precious Metals has provided over \$7.5 billion to our mining partners. Streaming is the flexible, non-dilutive option to improve project IRRs.



Value through streaming.

In celebration of CMP's 50th anniversary Scott Martin asked some of the 'regulars' to share their CMP experiences.



Phil Cancilla Remembers His First CMP

"I remember coming to my first CMP Ottawa in the late 1980s. The third floor restaurant seemed to be the unofficial meeting place for the movers and shakers of the conference. There was a special table just inside the restaurant entrance that was always crowded with the whose/who and never a seat available unless you were asked to join. At that time I was a newbie and didn't know what to do and how to get inside the circle. As time went on I realise that these people were just like me just a little older or a little hair next thing I knew, I was one of them. That's what I have learn to love about the CMP we take in all that are new to the industry or to the conference and make them feel part of our family. People in the circle and sometimes are the table were the likes of : Bert Huls, Gord Agar, Colin Chapman, Godfrey MacDonald, Lud Strah, Klaus Konigsmann, Eric Cunningham, Jim Gowans, Paul Semple, Ernie Marcotte, these are just a few but there are many more that I can call more than just friends. All those around the table, I knew would teach me a lot once I met them. Over the years I made a point to meet them all and many more that's what I thank the CMP for"



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How the CMP Began...

Ernie Marcotte shares his story this week on the roots of the CMP:

In 1957 a group of gold mill superintendents, metallurgists and mill foremen, in the Timmins (Porcupine) area, began meetings to discuss methods of improving gold mill operations. The meetings proved to be very beneficial and resulted in many operating costs and metallurgical improvements for the respective mills. Likewise, gold mill superintendents in the Kirkland-Larder, Malartic-Val d'Or and Red Lake areas soon formed similar groups of their own. The overall groups adopted the name Canadian Gold Metallurgists (CGM). A meeting attended by about 25 gold mill superintendents from across Canada was held in Ottawa at the Mines Branch, Extractive Metallurgy Division in January 1962. This meeting was so successful it was decided to hold another meeting in January, 1963.



CGM Fourth Annual Meeting January 1967 at Camshell Hall, Mines Branch, Ottawa. George Hawkes, Mill Superintendent, Kerr Addison and Ernie Marcotte, Mill Superintendent, Upper Canada, in foreground.

Thus, began the series of successful operators' conferences, which have continued every January to date. Managers and Mill Superintendents at base metal mines soon learned of this vibrant, proactive group of gold metallurgists and the many improvements that occurred in the gold mills. They asked to be invited to the meetings and become part of the group. In 1968, at the annual CGM meeting, it was decided that mill representatives from the base metal mines join the Gold Metallurgists to form the Canadian Mineral Processors (CMP). The first annual meeting of CMP was held in Ottawa in January, 1969.



From Student in 1997 to CMP Chairwoman in 2017-2018

Current Chair, Johnna Muinonen, shares experiences from her first CMP and advice for current students:

“My first CMP was in 1997. I attended as one of the CMP A/V Students. In those days, students actually had to flip transparencies or advance the slide projector! The students all flipped in fear that they would get blamed for the presenters having an upside down or backwards slide! I had some experience in industry from my student jobs so I knew a few people, but not many. It was very intimidating, seeing all these people come together and greet each other. Not just as colleagues, but as friends and family. I had no idea how to meet people and network! But in the end, several friendly people introduced themselves. Two of them stand out in my memories, Stuart McTavish and Paul Semple. We spent a bit of time talking (them mostly talking and us mostly listening) over a drink (or two). To this day, I remember their advice (paraphrased) “Find the smallest town you ever could consider living, and work in an operation there as a young engineer. Work there for 5 -10 years and then find somewhere larger. You will get more opportunity and experience sooner in a smaller operation”.

I look back on that now, 20 years later, and think how great that advice was, how relevant it was to my career and how that is the advice I pass on to other students when they ask how my career has been shaped by the choices I made. Also, 20 years later, while unfortunately Paul is no longer with us, I still count on seeing Stuart at CMP events and consider him a mentor and friend. That is a unique benefit of the CMP conference!



CanmetMINING and the Canadian Mineral Processors: A Golden Partnership



Janice Zinck shares a story on a golden partnership:

Fifty years ago CanmetMINING, then known as the Mines Branch of the Department of Mines and Technical Surveys, was instrumental in bringing together operators from Canada's gold industry to form the Canadian Gold Metallurgists – now known as the Canadian Mineral Processors (CMP). The first meeting took place at Camsell Hall on the Mines Branch campus (now Natural Resources Canada - NRCan) in 1964.

NRCan, through CanmetMINING, continues to actively support the Canadian Mineral Processors serving as the Secretariat for the 3000+ member organization through management of CMP's national office. In addition to filling two executive positions, CanmetMINING is also the organizer for the annual operators' conference. The organizing committee is a very small and efficient team and includes the following CanmetMINING current and retired employees – Wesley Griffith, Rory Cameron, John Chaulk, Al Kuiper, Dave Hardy, Louise Madaire and Janice Zinck. The symbiotic relationship between the CMP and CanmetMINING is mutually beneficial, bringing value to both organizations for over fifty years and long into the future to advance innovation in mineral processing.



CMP Organizing Committee



A Story on the Benefits of the CMP

John Starkey shares with us his memories of past CMP's and how CMP has helped him grow his company:

The CMP 50th anniversary is a good time to step back and realize some of the benefits that accrue to the mining industry that relate to the CMP organization. In my case, I have had the good fortune to be part of the CMP Executive and Board for about 15 years, first as Chair of the Toronto Branch, then as Chair of the National CMP and finally for the past 10 years as a member-at-large on the Board of Directors. Starkey & Associates Inc. (Starkey) has supported the Student Program for this period because I believe that the future of our industry is directly related to how we treat our students and to the opportunities that are created by them being part of this annual conference.

In many ways, the success that Starkey has enjoyed, directly relates to the CMP, because three academically strong, well equipped young engineers were hired specifically because I met them at the CMP as students, learned of their achievements and subsequently hired them to work at Starkey. First was Paul Scinto in 2009, followed by Spencer Reeves in 2010 and then by Jenna Hedderson in 2012. Paul was with us for 3 years. Spencer came as a Co-op student in 2011 and returned full time in 2014 after earning a Master's degree at Queen's, while Jenna joined in 2012 after completing three co-op work terms at the Williams Mine in Marathon ON, not far from her alma mater, Lakehead U, in Thunder Bay. Jenna is now our first 5 year veteran at Starkey.

During the past 8 years these three engineers have been instrumental in completing the development work on SAGDesign, SAG Variability and Bond Variability testing, and in making the company viable. Thank you Paul, Spencer, Jenna and CMP!

History of the CMP Hockey Game (Now the Ray MacDonald Memorial Hockey Game)

Pierre Julien shares with us how the Ray MacDonald Memorial Hockey Game started:

Another story from “The Table”!! At the entrance of the Landmark Bar there was a coffee table, a small couch and room for 3-4 chairs. This table was the epicenter of where all great, and not so great ideas originated, and where Lud Strah could be regularly be found regaling his mineral processing disciples. At this table, at CMP 2000, was where the idea of the of the CMP Hockey game was hatched and where the format and draft rules were formulated by Maurice Tagami, Greg Romain, Heikki Laurila, Paul Semple, Phil Cancilla and myself. My apologies if I have forgotten anyone.

The first idea to be tabled was a game of shinny on the canal. As the libations flowed the ideas got bigger and with Mr. Paul “Go big or stay home” Semple as the visionary leader we had gone from a game of shinny to playing at the Corel Center (home of the Senators)!! None of us were really keen to play outdoors in the cold, so the Corel Center made a lot of sense. We established that this should be an East vs. West game and Maurice was appointed as the GM of team west. Decision on the draft was made quickly, East gets Finland, West gets the rest of the world. Maurice didn’t seem too excited to be getting Chile, Mexico, Australia and South Africa, emerging hockey powers! The CMP Toronto Branch stepped forward to provide the seed funding to purchase the first set of Jersey’s. Ray McDonald volunteered to organize the rink and Phil Cancilla took on the critical role of organizing the beer and the transportation – something he still does to this day. The following January, the first CMP Challenge Cup (now Ray McDonald Memorial) was played and Team East victoriously hoisted the first Kilborn Cup. The rest is history!!!



Phil Cancilla and Aymerie Lefebvre hoisting the first trophy at the first CMP Hockey Game January 24, 2001



Team Eastern Canada at first CMP Hockey Game



Team Western Canada at first CMP Hockey Game



A Student's Perspective...

Veronica Knott shares with us her memories from CMP 2017:

Last year was my first time attending the National CMP Conference in Ottawa as a sponsored student and it was an amazing experience. There were two things that really stood out for me. First, the mentorship at CMP was unlike any other conference I'd attended. Instantly, I felt welcomed and that the entire CMP community was involved in my learning and interest in a metallurgical career. Second, the academic papers presented showed a really interesting insight into the current mineral processing work going on in Canada. I loved the passion behind each of the presenters and the impressive innovations that are going on in the industry currently. Who would have thought a presentation on choke feeding a secondary crusher would have a conference room full of people laughing!

I walked away from my first conference excited to join the career of mineral processing and with the feeling of a full community of support behind me. I think this program is a fantastic way of showing students what their opportunities are in the industry and what the different paths their career could take.



Pictured Left to Right: Joel Yue, Veronica Knott, Jon Ladyman, Ian Hengemuhle, students at 2017 CMP Conference.



RAFFLE FOR OTTAWA SENATOR TICKETS



Five pairs of tickets to see Ottawa Senators vs Boston Bruins on January 25th at 7:30pm will be given out Thursday January 25th. Transportation to/from the game provided.

FEEDBACK

We welcome your feedback. Please contact us at rory.cameron@canada.ca. Thanks.



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Canadian Mineral Processor Past Award Recipients

Year	Mineral Processor of the Year (1)	Bill Moore Special Achievement Award	Lifetime Achievement Award (2)	Ray MacDonald Volunteer Award	Art McPherson Communiton Award	Best Presentation Award	Past Chair Award	Andre Lapante Memorial Scholarship	Byron Knelson Memorial Scholarship	Lucky Amaratunga Student Technical Report Award
2017	Kevin Gannon	Dominique Girard	Larry Urbanoski	Ken Roberts	not awarded	David Hall	Paul Blatter	David Georges-Filteau	Jonathan Ladyman	Eric Bernabé Nzokem Jeutsa
2016	Jennifer Abols	not awarded	Brian Flintoff	Stuart McTavish	Doug Farnell Steve Thompson awarded at SAG 2015	Ben Murphy	Tad Crowie	Graham Bonn	Anthony Clapperton	David Georges-Filteau
2015	Robert Rotzinger	not awarded	René Del Villar	Ray MacDonald (posthumously)	Ken Major	Rodrigo Araya	Pierre Julien	Michele Tuchscherer	William Yin	Kristie Peloquin Graham Cross
2014	Paul Cousin	Jocelyn Bouchard	John Goode	Ernie Marcotte Eddie Joe	not awarded	Jim Wickens	Erin Legault	Michael MacArthur	David Fenrich	Shaheer Sanuri
2013	Denis Cimon	Brent Hilscher	Ernie Marcotte	Richard Robillard	not awarded	Robert Visintainer	Donald Leroux	Cooper Meadows	Adrian Bill	Syed Saad Ali
2012	John Folinsbee	Kieth Merriam	Lucky Amaratunga	Chris Fleming, Tony Lipiec, Larry Urbanoski	Steve Morrell awarded at SAG 2011	Rob Thorpe	Dominic Fragomeni	Gary Yang		Xiang Zhou
2011	Jean Robitaille	Yves Breau	not awarded	Janice Zinck		Claude Bazin & Marilène Renaud	Robert Henderson	Bradley Kaplin		Spencer Reeves
2010	Chris Fleming	Peter Langlois	not awarded		Rob McIvor	Eduardo Nunez	Ian Orford	Eric McIntyre		Lauren Flett
2009	Jim Barrett	Ken Roberts	not awarded		not awarded	Jodi Roberts	John Folinsbee	Paul Scinto		Alexander Burns
2008	Michael Allan	Zhenghe Xu	not awarded		not awarded	Chuck Edwards	Colin Hardie	Lauren Flett		Jean-François Boulanger
2007	Ron Colquhoun	Jennifer Abols	not awarded		John Russell	Jan Nessel & Peter Radziszewski	John Starkey			John Burchell
2006	Ken Stowe	Johanna Muinonen	not awarded		Derek Barratt	Dan Curry	Jennifer Abols			Lindsay Rowland
2005	Larry Urbanoski	Fred Rizzuto	Ray MacDonald		not awarded	André Laplante	Steve Wilson			
2004	Bert Hulls	Manqui Xu	not awarded		John Starkey	Carl Duchesne	Jan Nessel			
2003	Peter Wells	Mike Rylatt	Lud Strah		not awarded	Brigitte Lacouture	Mike Smith			
2002	Godfrey McDonald	Ray MacDonald	not awarded		not awarded	Peter Langlois	Maurice Tagami			
2001	Chuck Edwards	Joe Holmes	not awarded		Andrew Mular	Rob Perry	Richard May			
2000	Gil Labarre	Steve Wilson	not awarded			Jim Finch	Chuck Edwards			
1999	John Kazakoff	Collin Hardie	not awarded			Steve Wilson	Jeff Austin			
1998	Chris Larsen	Claude Bazin	not awarded			Chuck Edwards	Mike Mular			
1997	Daryl MacNamara	Allen Gardiner	Andrew Mular			Grant Feasby	Luc Duval			
1996	Jacques McMullen	Pierre Lacombe	not awarded			Jim Finch & Glenn Dobby	Lloyd Buckingham			
1995	Cory Sibbald	Daniel Houdouin	Klaus Konigsmann			André Laplante	Bert Hulls			
1994	Ernie Marcotte	Brian Flintoff	Gordan Agar			Jeff McLaughlin	Brad Marchant			
1993	John Knapp	André Laplante				Michael Allan & Brian Flintoff	Klaus Meyer			
1992	Gerald Veillette	Glen Kosick				Robert Edwards	Leonard Surges			
1991	Ken Thomas	Tony Harris				Glen Kosick	Bill Moore			
1990	Dick Coleman	Olga Matwienko				Ross MacFarlane	Bill Moore			
1989	Doug Knight	Glenn Dobby				Godfrey McDonald	Godfrey McDonald			
1988	Clyde Lendrum	Brad Marchant				Ernie Marcotte	Ernie Marcotte			
1987	Mike Amsden	Chris Brown				Graham Karklin	Graham Karklin			
1986	Bill Timm	Peggy Witte				Rudy Tenbergen	Rudy Tenbergen			



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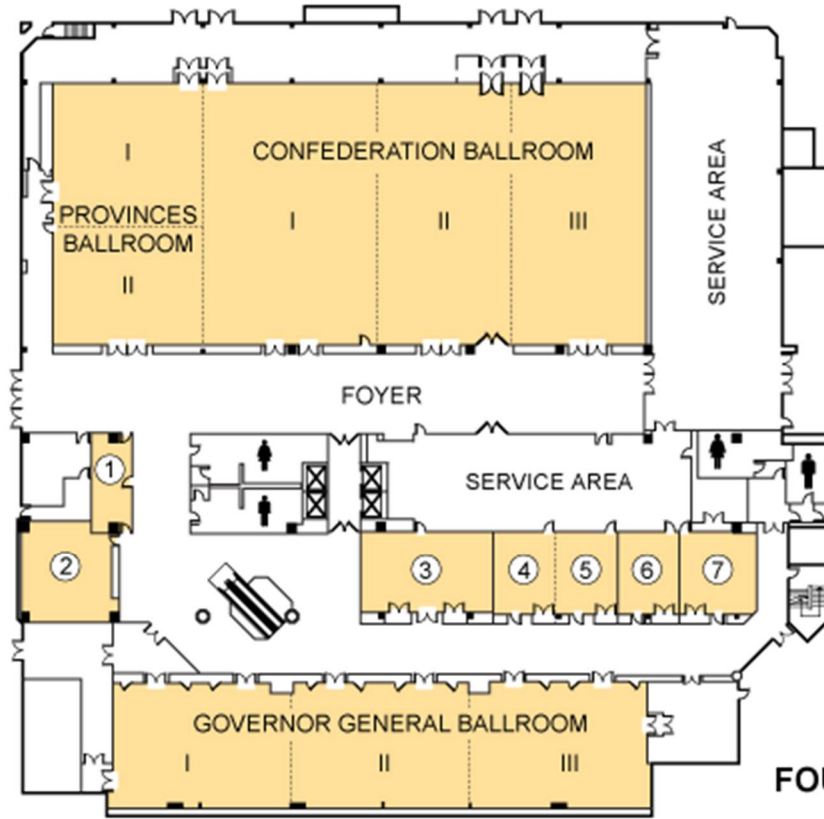
in f **#CIMBC18**

CIM 2018 Convention is the place to:

- Share knowledge and best practices
- Get the latest industry updates
- Build and renew connections
- Promote diversity and inclusion
- Meet young and future leaders
- Do business at the EXPO –
Canada's Mining Marketplace
- Celebrate excellence and enjoy social events

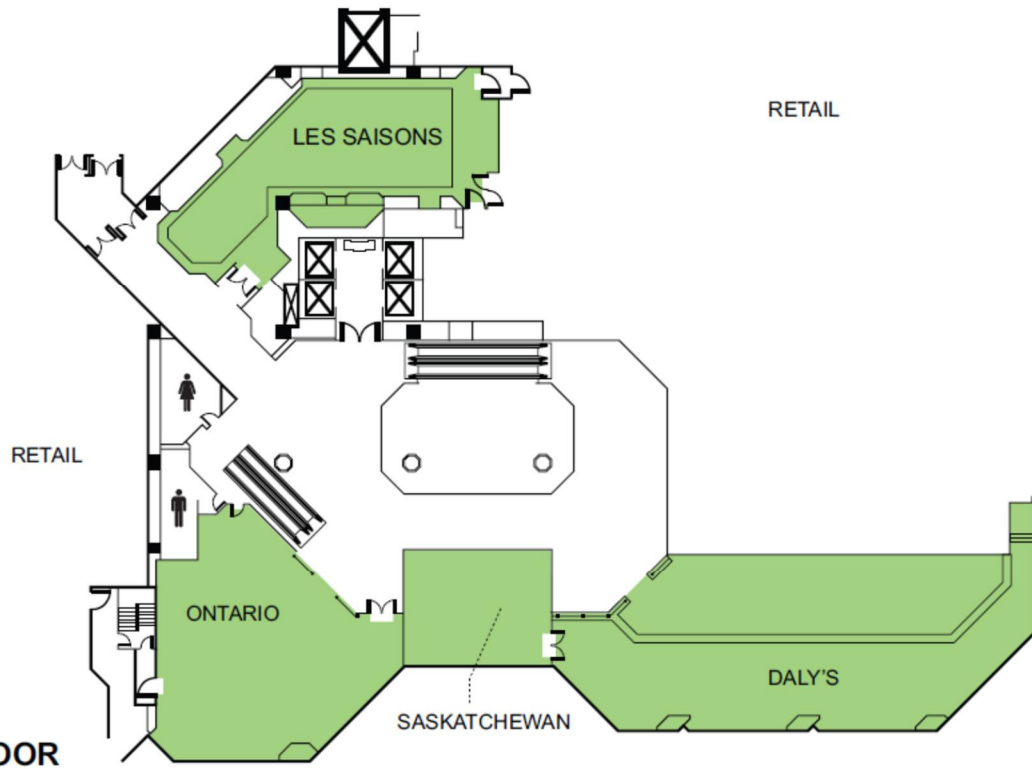
CONVENTION.CIM.ORG

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ADDITIONAL NOTES



ADDITIONAL NOTES



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