Final Programme

9–12 July 2018

Avani Victoria Falls Resort, Livingstone, Zambia
**FINAL PROGRAMME**

**MONDAY 9 JULY**

08:00–12:30  **Short Course: An Introduction to the SAMREC and SAMVAL Codes**  
Lion Room

08:00–16:30  **Short Course: Hydrometallurgical Processing of Cobalt**  
Elephant Room

15:00–17:00  **Conference Registration**  
Zebra Room

15:00–17:00  **Uploading of Tuesday presentations with Audiovisual Crew**  
Giraffe Room

17:00–19:00  **Welcome Cocktail Party, sponsored by Sibelco Australia**  
The Sundeck, Zambezi River, Royal Livingstone Hotel

**TUESDAY AM 10 JULY**

07:00–17:00  **Registration**  
Zebra Room

07:00–14:00  **Uploading of Tuesday presentations with Audiovisual Crew**  
Giraffe Room and Elephant Room

**PLENARY SESSION I: COMBINED VENUE: GIRAFFE AND ELEPHANT ROOMS**

**Session Chair:** Kathy Sole, *Consulting Hydrometallurgist (South Africa)*

08:15–8:25  **Opening of Conference**  
Kathy Sole, *Conference Chair (South Africa)*

08:25–8:35  **Official Welcome from the Southern African Institute of Mining and Metallurgy**  
Sehliselo Ndlovu, President of SAIMM (South Africa)

08:35–8:45  **Official Welcome to Zambia**  
The Honourable Richard Musukwa, *Minister of Mines and Minerals Development (Zambia)*

08:45–9:25  **Keynote Address: Zambian mining’s polymetallic future**  
Sokwani Chilembo, *CEO of the Zambian Chamber of Mines (Zambia)*

09:25–9:55  **Premium Sponsor and Welcome Function Sponsor**  
Sibelco (Australia)

09:45–10:25  **Keynote Address: Cobalt and the rise of the lithium-ion battery megafactories**  
Caspar Rawles, *Benchmark Mineral Intelligence (United Kingdom)*

10:25–10:35  **Premium Sponsor**  
BASF (South Africa)

10:25–10:35  **TEA BREAK**

**SESSION 1A–GENERAL: GIRAFFE ROOM**

**Session Chair:** Darius Muma, Mopani Copper Mines and SAIMM Zambian Branch Chair (Zambia)

11:05–11:30  **1A-1: The state of occupational safety in the South African mining industry: progress, successes and challenges**  
S. Phakathi and K. Letsoalo, *Minerals Council of South Africa (South Africa)*
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:20–12:45</td>
<td>1A-4: Project evaluation: the drivers behind a mineral project’s value</td>
<td>B. Botha, <em>VBKOM Consulting (South Africa)</em></td>
</tr>
</tbody>
</table>

**SESSION 1B–HYDROMETALLURGY I: ELEPHANT ROOM**

**Session Chair:** Tanja Marcus, *ProProcess (South Africa)*

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:05–11:30</td>
<td>1B-1: Advances in cobalt recovery and purification</td>
<td>C. Pawlik, <em>Mintek (South Africa)</em></td>
</tr>
<tr>
<td>11:30–11:55</td>
<td>1B-2: Milling in acidic raffinate solution in copper–cobalt hydrometallurgy circuits: the next step towards reducing operating costs</td>
<td>E. Mkhize and S. Kumwenda, <em>SENET (South Africa)</em></td>
</tr>
<tr>
<td>11:55–12:20</td>
<td>1B-3: Frothing and froth control in copper leach washing and purification circuits</td>
<td>N. Mautsa, M. Bower, B. Nel and J. Miller, <em>Kemira (South Africa and United Kingdom)</em></td>
</tr>
<tr>
<td>12:45–13:45</td>
<td>LUNCH BREAK</td>
<td></td>
</tr>
</tbody>
</table>

**TUESDAY PM 10 JULY**

**SESSION 2A–GEOLOGY & MINING I: GIRAFFE ROOM**

**Session Chair:** Steven Rupprecht, *University of Johannesburg (South Africa)*

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:45–14:10</td>
<td>2A-1: Satellite synthetic aperture radar for mine and tailings dam monitoring</td>
<td>N. Pendock, <em>DIRT Exploration (South Africa)</em></td>
</tr>
<tr>
<td>14:35–15:00</td>
<td>2A-3: Determination of an effective slope monitoring regime for mining a failed zone on the north wall of Nchanga Open Pit 2</td>
<td>C. Silwamba, S. Syamusana and B. Sikakwi, <em>Zambia</em></td>
</tr>
</tbody>
</table>

**SESSION 2B–SOLVENT EXTRACTION I: ELEPHANT ROOM**

**Session Chair:** Peter Cole, *Peter Cole Metallurgical Services (South Africa)*

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:45–14:10</td>
<td>2B-1: Techno-economic evaluation of BASF’s new high-temperature solvent extraction reagent</td>
<td>J.J. Taute and S. Archer, <em>BASF and SENET (South Africa)</em></td>
</tr>
<tr>
<td>14:35–15:00</td>
<td>2B-3: Silica mitigation in copper solvent-extraction circuits</td>
<td>K.C. Sole, F. Crundwell, N. Dlamini and G. Kruger, <em>University of Pretoria, CM Solutions and Market to Africa (South Africa)</em></td>
</tr>
<tr>
<td>15:00–15:30</td>
<td>TEA BREAK</td>
<td></td>
</tr>
</tbody>
</table>
SESSION 3A–GEOLOGY & MINING II: GIRAFFE ROOM

Session Chair: Matt Mullins, Tacoma Strategies (South Africa)

D. Forest and N. Pendock, N-Side Mining Technology (Singapore)

15:55–16:20 3A-2: Copper ore variability: benefits of advanced simulation
M. Talikka, A. Remes, M. Hicks, J. Liipo, V.-P. Takalo, S. Khizanishvili and M. Natsvlishvili, Outotec (Finland) and JSC RMG Copper (Georgia)

16:20–16:45 3A-3: A ranking methodology to prioritise artisanal and small-scale mining projects
S. Rupprecht, University of Johannesburg (South Africa)

SESSION 3B–SOLVENT EXTRACTION II: ELEPHANT ROOM

Session Chair: Gift Chisakuta, BASF (Zambia)

15:30–15:55 3B-1: Additive to mitigate crud formation in solvent extraction operations
B. Mbao, L. Cohen, A. Fischmann, L. Moya, M. Moser and O. Tinkler, Solvay (Zambia and USA)

15:55–16:20 3B-2: Loaded organic washing for impurities removal from electrolyte
D. Nel, J. Kyabu, T. Ngoy, P. Koji and P. Bwando, Mutanda Mining and BASF (DR Congo)

16:20–16:45 3B-3: On-line analysis in solvent extraction process
R. Abod, L. Koresaar, D. Moreno and T. Balbin, Outotec and Cobre Las Cruces (Finland and Spain)

WEDNESDAY AM 11 JULY

07:00–15:00  Registration
Zebra Room

07:00–13:30  Uploading of Wednesday presentations with Audiovisual Crew
Giraffe Room and Elephant Room

PLENARY SESSION II–COMBINED VENUE: GIRAFFE AND ELEPHANT ROOMS

Session Chair: Sehliselo Ndlovu, University of the Witwatersrand and President of SAIMM (South Africa)

08:15–8:20 Welcome and Announcements

08:20–9:00 Keynote Address: The challenges of mining, particularly in Africa (including a brief history of First Quantum Minerals)
M. Pascal, First Quantum Minerals Ltd (Zambia)

09:00–9:10 Premium Sponsor: Outotec (South Africa)

09:10–9:50 Keynote Address: Overview and outlook for the cobalt market
L. Smith, Core Consultants (United Kingdom)

09:50–10:00 Premium Sponsor: Solvay (USA)

10:00-10:30 TEA BREAK

SESSION 4A–COMMINUTION: GIRAFFE ROOM

Session Chair: Vongani Nkuna, Ivanhoe Mines SA (South Africa)

10:30–10:55 4A-1: Assessing the benefits of automatic grinding control using particle size tracking technology for true on-line particle size measurement
R. Maron, C. O'Keefe and J. Sepulveda, CiDRA Minerals and J-Consultants (USA and Chile)
A. Hinde, E. Ford, J. Makola and A. Jan, Independent consultant, Mintek, Derrick Solutions International and Derrick Corporation (South Africa and USA)

11:20–11:45  4A-3: Merits of optimised milling configuration on process performance: a case study of the mixed ore at Kansanshi
C. Chongo, K. Ngoisa, P.A. Bepswa and A.N. Mainza, Kansanshi Mine and University of Cape Town (Zambia and South Africa)

11:45–12:10  4B-1: Design of a selection guide for copper electrowinning sizing: cell arrangement as a function of rectiformer size for varying throughputs
E. Forner, G. Miller, J. Scheepers and A.J. du Toit, DRA Global and Miller Metallurgical International (South Africa and Australia)

10:55–11:20  4B-2: Advances in permanent cathode maintenance solutions
L. Nordlund and H. van der Walt, Outotec (Finland)

11:20–11:45  4B-3: Lead contamination of copper cathodes: direct electrowinning compared with leach/solvent extraction/electrowinning
G. Mitshabu, C. Tshula, P. Tshisand, B. Faqing and A. Feather, BASF, Gécamines Luilu Refinery and Ruashi Mining (DR Congo and South Africa)

11:45–12:10  4B-4: Determination of MCM2 copper cathode sampling regime
O. Mahenga, D. Muma, B. Muleya, E. Musenge and G. Bwalya, Mopani Copper Mines and Zambia Revenue Authority Mineral Beneficiation Laboratory (Zambia)

12:10–12:35  4B-5: Electrochemical characterisation of cobalt electrowinning from dilute sulphate solutions
R. Wildenboer, University of Pretoria (South Africa)

12:25–13:30  LUNCH BREAK

SESSION 4A–HYDROMETALLURGY II: GIRAFFE ROOM
Session Chair: Davies Kakengela, Castle Lead (Zambia)

10:30–10:55  4B-1: Design of a selection guide for copper electrowinning sizing: cell arrangement as a function of rectiformer size for varying throughputs
E. Forner, G. Miller, J. Scheepers and A.J. du Toit, DRA Global and Miller Metallurgical International (South Africa and Australia)

10:55–11:20  4B-2: Advances in permanent cathode maintenance solutions
L. Nordlund and H. van der Walt, Outotec (Finland)

11:20–11:45  4B-3: Lead contamination of copper cathodes: direct electrowinning compared with leach/solvent extraction/electrowinning
G. Mitshabu, C. Tshula, P. Tshisand, B. Faqing and A. Feather, BASF, Gécamines Luilu Refinery and Ruashi Mining (DR Congo and South Africa)

11:45–12:10  4B-4: Determination of MCM2 copper cathode sampling regime
O. Mahenga, D. Muma, B. Muleya, E. Musenge and G. Bwalya, Mopani Copper Mines and Zambia Revenue Authority Mineral Beneficiation Laboratory (Zambia)

12:10–12:35  4B-5: Electrochemical characterisation of cobalt electrowinning from dilute sulphate solutions
R. Wildenboer, University of Pretoria (South Africa)
14:20–14:45  5A-3: Acid bake–leach process for recovering copper and cobalt from complex sulphide–oxide concentrates  
  P. Mwamba, J.H. Masinja, J. Manchisi and Y.R.S. Hara, University of Zambia and Copperbelt University (Zambia)

14:45–15:10  5A-4: Polymetallic processing within a circular economy  
  P. van Staden, M. Gerice, V. Conic and D. Milanovic, Mintek and Mining and Metallurgy Institute (South Africa and Serbia)

SESSION 5B–ION EXCHANGE AND MEMBRANES: ELEPHANT ROOM
Session Chair: Johanna van Deventer, Purolite (South Africa)

13:30–13:55  5B-1: Recovery of cobalt and nickel from acidic waste streams: effect of chloride, sulfate and column studies using phosphonic acid-functionalised silica  
  J.T.M. Amphlett, S.E. Pepper, W. Peng and M.D. Ogden, University of Sheffield (United Kingdom)

13:55–14:20  5B-2: Cobalt–nickel pertraction refinery to process pregnant leach solution from recycled spent catalysts. Part 1: Cobalt extraction from a binary system  
  N. Mans, D. van der Westhuizen, D. Bruinsma, P. Cole, J. du Toit, E. Munnik, A. Coates, V. Coetzee and H. Krieg, Northwest University, Bruinsma Solutions, Peter Cole Metallurgical Services, DRA Global and Minemet (South Africa)

14:20–14:45  5B-3: Metal removal from synthetic mine tailings leachates using fixed-bed ion-exchange columns  
  A.L. Riley, S.E. Pepper, E.L. Sexton and M.D. Ogden, University of Sheffield (United Kingdom)

14:45–15:10  5B-4: Solvent-impregnated resins for niche applications in metal processing  
  V. Yahorava, V. Bazhko and R.R. Leso, Mintek (South Africa)

15:10–15:30  TEA BREAK

15:30  Buses leave for River Cruise–pick-ups from AVANI Victoria Falls and Royal Livingstone Hotels

16:00–18:00  Luxury Sunset Cruise and Game Viewing on the Zambezi River  
  Sponsored by Axis House  
  African Queen and Lady Livingstone

18:30–22:00  Boma Braai Conference Dinner  
  Sponsored by ALS Global  
  Mukuni Boma, AVANI Victoria Falls Hotel

THURSDAY AM 12 JULY

07:00–16:00  Registration  
  Zebra Room

07:00–14:00  Uploading of Thursday presentations with Audiovisual Crew  
  Giraffe Room and Elephant Room

PLENARY SESSION III: COMBINED VENUE: GIRAFFE AND ELEPHANT ROOMS
Session Chair: Jackson Sikamo, Chairman and Country Manager  
  Chibuluma Mines PLC (Zambia)

08:15–8:20  Welcome and Announcements

08:20–9:00  Keynote Address: P3-1: The Giant Kamoa–Kakula Project in the Democratic Republic of Congo  
  S. Amos, V. Nkuna and B. Matsetela, Kamoan Copper SA and Ivanhoe Mines (South Africa)
9:00–9:10  Cruise Sponsor and Social Media Sponsor
Axis House (South Africa)

9:10–9:50  Keynote Address: Urban mining and the pivotal role of hydrometallurgical approaches for recycling secondary source feeds
B. Currie, Ausenco (Australia)

9:50–10:00  Dinner Sponsor
ALS Global (South Africa)

10:00–10:30  TEA BREAK

SESSION 6A–CONCENTRATION AND FLOTAION: GIRAFFE ROOM
Session Chair: Shamudulu Shamaila, WorleyParsons (South Africa)

M. Lusamboa and F.K. Mulenga, Kansanshi Mine and University of South Africa (Zambia and South Africa)

10:55–11:20  6A-2: Relationship between Kansanshi ore mineralogy and copper recovery across different processing circuits
L. Little, Q. Mclennan, A. Prinsloo, B. Kaputula and C. Siame, Kansanshi Mine (Zambia)

11:20–11:45  6A-3: Flotation process metering of concentrate, slurry, air and water flows using non-intrusive fibre-optic sensing
D. Finfer, Silixa Ltd. (United Kingdom)

11:45–12:10  6A-4: Continuous improvement of a copper concentrator by advanced flotation control
P.D. Knoblauch, Mintek (South Africa)

12:10–12:35  6A-5: Development of flotation reagent automated system
C. Ngulube, W. Munalula and I. Mkandawire, Kansanshi Mine (Zambia)

12:35–13:00  6A-6: Copper recovery from carboneous sulphide ores by flotation
R.S. Magwaneng, K. Haga, A. Batnasan, A. Shibayama, M. Kosugi, R. Kawarabuki, K. Mitsuhashi and M. Kawat, Akita University and Nittestu Mining (Japan)

13:00–14:00  LUNCH BREAK

SESSION 6B–PROJECTS AND OPERATIONS I: ELEPHANT ROOM
Session Chair: Eleanore Forner, DRA Global (South Africa)

10:30–10:55  6B-1: Processing of Copperbelt historical copper smelter slag through the Chibuluma concentrator and future prospects for maximising value recovery
B. Kaluma, A. Mwansa and J. Sikamo, Chibuluma Mines (Zambia)

D. Alexander, C. van der Merwe, R. Lumbule and J. Kgomo, Eurasian Resources Group and Boss Mining (South Africa and DR Congo)

11:20–11:45  6B-3: BOSS 50: A fast-track project in the Democratic Republic of Congo
A. Lathwood, (DR Congo)
<table>
<thead>
<tr>
<th>Time</th>
<th>Session 7A – Tailings and General: Giraffe Room</th>
<th>Session 7B – Projects and Operations II: Elephant Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:45–12:10</td>
<td><strong>6B-4: The historic Kipushi zinc project in the Democratic Republic of Congo</strong>&lt;br&gt;B. Masetela, V. Nkuna and S. Amos, Ivanhoe Mines and Kamoza Copper SA (South Africa)</td>
<td><strong>7A-2: Tailings thickener improvements at Sentinel Copper Mine</strong>&lt;br&gt;M. Bower and M. Kynkaanniemi, Kemira Chemicals and Minera Panama (United Kingdom and Panama)</td>
</tr>
<tr>
<td>12:35–13:00</td>
<td><strong>6B-6: Copper refinery modernisation, Mopani Copper Mines plc, Mufulira, Zambia</strong>&lt;br&gt;M. Chooye, R. Patel, A. Pranowo and B. O’Rouke, Mopani Copper Mines and Glencore Technology (Zambia and Australia)</td>
<td><strong>7A-4: Disruptive effect of battery recycling on the near future cobalt market</strong>&lt;br&gt;N. Steenkamp, Consulting Geologist and Geotechnical Engineer (South Africa)</td>
</tr>
<tr>
<td>13:00–14:00</td>
<td><strong>LUNCH BREAK</strong></td>
<td></td>
</tr>
</tbody>
</table>

**THURSDAY PM 12 JULY**

**SESSION 7A – Tailings and General: Giraffe Room**

**Session Chair:** Alain Kabemba, SIMEKA Infrastructure and Services (South Africa)

<table>
<thead>
<tr>
<th>Time</th>
<th>Session 7A – Tailings and General: Giraffe Room</th>
<th>Session 7B – Projects and Operations II: Elephant Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:00–14:25</td>
<td><strong>7A-1: Dewatering tailings for dry stacking: Rapid water recovery by means of centrifuges</strong>&lt;br&gt;R. Klug, A. Rivadeneira and N. Schwarz, Flottweg, benaventura and Schwarz Global Consulting (Germany, Peru and South Africa)</td>
<td><strong>7B-1: Operational experiences of Mufulira ISASMELT technology since inception</strong>&lt;br&gt;J. Kapobe, J. Sasikumar, K. Chitundu, C. Mazala and R. Phiri</td>
</tr>
<tr>
<td></td>
<td><strong>7B-2: Sonic injection in sulphide smelting: an update</strong>&lt;br&gt;J. Kapusta, (Canada)</td>
<td><strong>7B-3: Operational readiness: from project to operating asset</strong>&lt;br&gt;R. Taute and P.M.J.G. Thomson, SENOPS (South Africa)</td>
</tr>
<tr>
<td></td>
<td><strong>7B-4: Outotec service portfolio and recent development in managing asset performance</strong>&lt;br&gt;J. Lempainen and M. Lindemann, Outotec (Finland)</td>
<td></td>
</tr>
<tr>
<td>15:40–16:15</td>
<td><strong>TEA BREAK and CLOSE OF CONFERENCE</strong></td>
<td></td>
</tr>
</tbody>
</table>
FRIDAY 13 JULY

Post-Conference Technical Tour to Kansanshi Mine, Smelter, Concentrator and Hydrometallurgy Plant
Sponsored by First Quantum Minerals
Solwezi, Zambia

SAIMM Coordinator: Wezi Banda, ERG Africa (South Africa)
Kansanshi Coordinator: Chanda Ngulube, Kansanshi Mine (Zambia)

06:30 Pickup at AVANI Victoria Falls Hotel and then Royal Livingstone Hotel for airport transfer
07:30 Charter flight to Solwezi
09:15–15:15 Technical tour, including lunch
15:45 Charter flight to Livingstone
18:00 Arrival back at AVANI Victoria Falls and Royal Livingstone Hotels
## TECHNICAL PROGRAMME AT A GLANCE
### Avani Victoria Falls Resort, Livingstone, Zambia

<table>
<thead>
<tr>
<th>Day</th>
<th>Zebra</th>
<th>Giraffe</th>
<th>Elephant</th>
<th>Lion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday 9 July</td>
<td>Registration and Conference Secretariat</td>
<td>Short course: Hydrometallurgical processing of cobalt</td>
<td>Short course: SAMREC and SAMVAL codes</td>
<td></td>
</tr>
<tr>
<td>Tuesday 10 July</td>
<td>Registration and Conference Secretariat</td>
<td>Plenary I</td>
<td>Hydrometallurgy I</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>General</td>
<td>Geology and Mining I</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Solvent Extraction I</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Geology and Mining II</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Solvent Extraction II</td>
<td></td>
</tr>
<tr>
<td>Wednesday 11 July</td>
<td>Registration and Conference Secretariat</td>
<td>Plenary II</td>
<td>Commination</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Electrowinning</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hydrometallurgy II</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ion Exchange and Membranes</td>
<td></td>
</tr>
<tr>
<td>Thursday 12 July</td>
<td>Registration and Conference Secretariat</td>
<td>Plenary III</td>
<td>Concentration and Flotation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Projects and Operations I</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tailings and General</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Projects and Operations II</td>
<td></td>
</tr>
<tr>
<td>Friday 13 July</td>
<td>Post-conference technical tour to Kansanshi Mine, Smelter, Concentrator and Hydromet Plant</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Copper Cobalt Africa 2018 Conference
The organizers of the conference wish to thank the following sponsors for their support.