

ALTA 2018
19 - 26 May
Perth, Australia

23rd Annual Conference Proceedings

Nickel-Cobalt-Copper Conference

Including

Hydromet Processing of Copper,
Nickel & Cobalt Sulphides Forum

Sponsored by



9th Annual Nickel-Cobalt-Copper Event

ALTA Metallurgical Services, Melbourne, Australia

www.altamet.com.au

PROCEEDINGS OF ALTA 2018 NICKEL-COBALT-COPPER SESSIONS

Including

Hydromet Processing of Copper, Nickel & Cobalt Sulphides Forum

21-23 May 2018

Perth, Australia

ISBN: 978-0-9946425-1-6

ALTA Metallurgical Services Publications

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Celebrating 32 years of service to the global mining and metallurgical industry.

ALTA Metallurgical Services was established by metallurgical consultant **Alan Taylor** in 1985, to serve the worldwide mining, minerals and metallurgical industries.

Consulting: High level metallurgical and project development consulting.

Conferences: ALTA conferences are established major events on the international metallurgical industry calendar. The event is held annually in Perth, Australia. The event comprises three conferences: Nickel-Cobalt-Copper, Uranium-REE-Lithium and Gold-PM.

Short Courses: Technical Short Courses are presented by Alan Taylor, Managing Director.

Publications: Sales of proceedings from ALTA Conferences, Seminars and Short Courses.

MetBytes: Free technical articles offering metallurgical commentary and insights.

Free Library: Conference proceedings and technical papers. The library is expanded regularly, providing a major ongoing resource to the industry.

Dinner Address

**A Metallurgist's Musings, Speculations and
What-ifs on Future Industry Driving Forces
and Trends**

Alan Taylor

ALTA Metallurgical Services

5

current trends
are driving major changes
in the mining industry

If they continue to gather momentum,
the changes could be

Unprecedented!!!

No. 1

Move towards electric vehicles (EVs)
and
renewable power generation



(Ref: Origin Energy Website, accessed 18 April 2018)



(Ref: Bloomberg New Energy Finance Website, accessed 18 April 2018)

which has dramatically increased projected demand for:

Lithium, Cobalt, Nickel, Manganese,
Graphite, Copper, Rare Earths

in his 2016 book [The Elements of Power](#),
David S Abraham writes:

“We are now witnessing a fundamental shift in our resource demands. At no point in human history have we used *more* elements, in *more* combinations, and in increasingly refined amounts. Our ingenuity will soon outpace our materials supplies.”

(Ref: Jocelyn Timperley, Carbon Brief, 16 April 2018)

No. 2

Growing opposition to nuclear power since Chernobyl and Fukushima disasters.

Possible game changers:

- Small modular reactors (SMRs) – e.g. for remote sites – not subject to weather – alternatives to solar and wind power.
- Permanent deep geological disposal of radioactive waste.



(Ref: Graphic of transport of a SMR produced by Oak Ridge Laboratory Chartered Institution of Building, UK, Website, accessed 8 May 2018)

No. 3

Move towards banning cyanide
for gold/silver extraction
in some countries.

If this becomes a global trend, it will force
change to alternative leaching reagents.

Current alternatives are more expensive,
and would lead to higher gold price.



\$ >>>>>>>>>>

No. 4

Growing opposition to wet tailings dams

If this continues to grow, it would provide a driving force towards production of “dry” (paste thickened/filtered) tailings and disposal by:

- Surface stacking
- Backfilling into mined-out pits
- Burial



(Dry stacking of tailings, Ref: Aqseptence-Hatch presentation, ALTA 2017)

No. 5

Growing opposition to open pit mines

If this continues to grow, it would provide a driving force towards:

- In-situ recovery (ISR)
- Deep sea nodules



(ISL Wellfield, Beverley Operation,
Heathgate Resources, South Australia)



(Deep Sea Nodule Field, Ref:
International Seabed Authority Website,
accessed 9 May 2018)

Of the 5 trends, the only good news for the mining industry is:

No. 1 the projected renewable energy and EV
boom

However, history tells us that boom times don't last forever so my advice is to:



(Ref: English Express School UK, Post., Google Pictures, Accessed 10 May 2018)