

ALTA 2015
23 - 30 May
Perth, Australia
20th Anniversary Event

Proceedings

Nickel-Cobalt-Copper Conference

Sponsored by



6th Annual Nickel-Cobalt-Copper Event

ALTA Metallurgical Services, Melbourne, Australia

www.altamet.com.au

PROCEEDINGS OF ALTA 2015 NICKEL-COBALT-COPPER SESSIONS

25-27 May 2015

Perth, Australia

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Celebrating 30 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.

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 over five days: Nickel-Cobalt-Copper, Uranium-REE and Gold-Precious Metals.

Free Library: Conference proceedings and technical papers. The library will be expanded each year, providing a major ongoing resource to the industry.

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

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

Consulting: High level metallurgical and project development consulting.

20th Anniversary Dinner Keynote

ALTA: 20 YEARS AS A WINDOW INTO THE WORLD OF PAL

By

Alan Taylor

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ALTA Metallurgical Services, Australia

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ALTA 1995, MELBOURNE, WHERE IT ALL STARTED



**ALTA 1995 WAS A WHO'S WHO OF THE PAL
REVIVAL IN THE 1990s**

MAJOR PROJECTS REPRESENTED AT ALTA 1995 INCLUDED

- Bulong Project – Resolute Group and Western Mining
- Murrin Murrin Project – Anaconda Nickel and Sherritt
- Cawse Project – Centaur Mining
- Ramu Project – Highlands Gold and Nord Resources
- Goro Project – Inco
- Ambotovy Project – Phelps Dodge

(Bulong and Ramu Projects were among the presentations)

**THIS SET THE TONE FOR THE FOLLOWING 20 YEARS.
AND IS REFLECTED IN THE KEYNOTE SPEAKERS**

ALTA KEYNOTE SPEAKERS WITH MAJOR PAL PROJECT INVOLVEMENT INCLUDE

ALTA 1996: Bob Pett Chairman of Resolute Samantha (Bulong)

ALTA 1997: Ken Hellsten General Manager Cawse Operations (Cawse)

ALTA 1998: Andrew Forrest, CEO of Anaconda Nickel, (Murrin Murrin)

ALTA 2000: Gord Bacon, VP Engineering & Technology, Inco (Goro)

ALTA 2001: Adrian Griffin CEO of Preston (Bulong)

ALTA KEYNOTE SPEAKERS WITH MAJOR PAL PROJECT INVOLVEMENT INCLUDE

ALTA 2006: Naoyuki Tsuchida, Executive VP, Coral Bay Nickel
Corporation (Coral Bay)

ALTA 2008: Peter Johnson, CEO Minara Resources (Murrin Murrin)

ALTA 2015: Naoyuki Tsuchida, Senior Managing Executive Officer,
General Manager of Engineering Division, Sumitomo Metal
Mining Company Ltd (Coral Bay and Taganito)

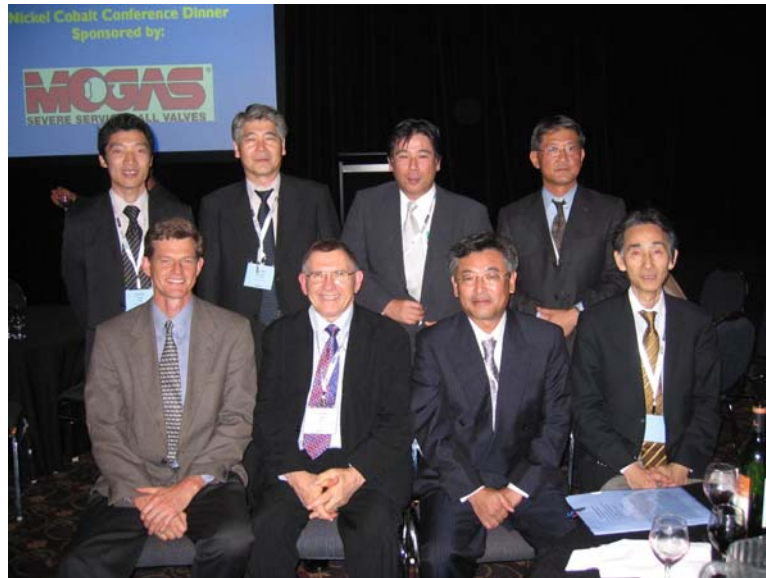
KEN HELLSTEN KEYNOTE ALTA 2007



ANDREW FORREST KEYNOTE ALTA 1998



NAOYUKI TSUCHIDA KEYNOTE ALTA 2006



**ALTA HAS BEEN A WINDOW INTO EVERY
COMMERCIAL PAL PROJECT
OVER THE 20 YEARS**

PRESENTATIONS ON COMMERCIAL PAL PROJECTS

- Bulong: 1995, 96, 97, 99, 2000, 01, 02, 03, 07
- Ramu: 1995, 97, 98, 2011, 15
- Cawse: 1996, 97, 99, 2000, 08
- Murrin Murrin: 1996, 98, 2011
- Moa Bay: 1996
- Ravensthorpe: 1999, 2000, 01, 05
- Goro: 2005, 13
- Ambotovy: 2005
- Coral Bay: 2006, 11, 15
- Taganito: 2015
- Gördes: 2015

**ALTA HAS ALSO BEEN A WINDOW INTO
NUMEROUS DEVELOPING PAL PROJECTS**

PRESENTATIONS ON DEVELOPING PAL PROJECTS

- Weda Bay, Indonesia
- Vermelho, Brazil
- Syerston, NSW, Australia
- Nonuc, Philippines
- Gladstone, QLD, Australia
- Marlborough, QLD, Australia
- Young, NSW
- Nekety/Bogota, New Caledonia
- Mindoro, Philippines
- Agata, Philippines

AND INTO PAL TECHNOLOGY AND ENGINEERING DEVELOPMENTS

PAL TECHNOLOGY AND ENGINEERING DEVELOPMENTS

- Development of commercial scale PAL design for laterites based on horizontal autoclaves and flash/splash heat recovery/preheating.
- Autoclave design based on titanium clad construction.
- Optimization of heat recovery/preheating systems.
- High pressure autoclave feed pump development.
- Development of improved severe service PAL system valves.
- Development of improved autoclave agitator designs.
- Application of advanced materials of construction – Titanium, special alloys, acid brick linings, piping.
- Autoclave scale growth and control.

PAL TECHNOLOGY AND ENGINEERING DEVELOPMENTS

- Rheology implications and solid/liquid separation.
- Development and application of MSP precipitation and processing.
- Development and application of MHP precipitation/ammonia leach/SX process
- Development of direct SX processes including synergistic SX systems for Ni/Co separation and recovery.
- SX equipment design including use of pulsed columns.
- Application of ion exchange for metals recovery including RIP.
- Ni and Co EW technology and equipment design.

PAL TECHNOLOGY AND ENGINEERING DEVELOPMENTS

- Iron control in PAL and downstream processing.
- Utilization of acid content of PAL discharge.
- Laterite feed beneficiation and upgrading.
- Importance, implications and use of mineralogical data.
- Planning and execution of testwork, pilot plant operation.
- Process modelling, scale-up, commissioning, ramp-up time and risk management.
- Potential recovery of by-products including scandium.
- Environmental/tailings disposal and health/safety issues including deep sea disposal.

PAL TECHNOLOGY AND ENGINEERING DEVELOPMENTS

- Technical and economic comparisons with alternative laterite treatment processes.
- Sulphuric acid production, energy cogeneration and process integration.

It has been an exciting journey over the past 20 years to be part of PAL story, and we appreciate all those presenters, delegates, sponsors and exhibitors who have made it all possible.

PAL has had it's ups and downs and is facing a growing list of competitors, which have also been featured at ALTA conferences.

That it is still very much alive is evidenced by the new operations, Taganito and Gördes featured here at ALTA 2015, as well as Ramu, Goro and Amotovy which have come on stream in recent years; and the "granddaddy" of them all, Moa Bay, is still soldiering on!

Of course, PAL and Laterites represent only one of the windows which ALTA conferences have provided over the past 20 years.

Currently we are also presenting windows into the processing of Nickel Sulphide, Cobalt, Copper, Uranium-REE and Gold-PM Ores.

We look forward to continuing our journey and we invite you to be part of it starting with ALTA 2016 next year!

**Thank you for being part of our
20th Anniversary Celebration**