

ALTA 2017
20 - 27 May
Perth, Australia
22nd Annual Event

Proceedings

Nickel-Cobalt-Copper Conference

Including

Ni-Co Pressure Acid Leaching Forum

Sponsored by



8th Annual Nickel-Cobalt-Copper Event

ALTA Metallurgical Services, Melbourne, Australia

www.altamet.com.au

PROCEEDINGS OF ALTA 2017 NICKEL-COBALT-COPPER SESSIONS

Including

Ni-Co Pressure Acid Leaching Forum

22-24 May 2017

Perth, Australia

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

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 will be expanded each year, providing a major ongoing resource to the industry.

Nickel-Cobalt-Copper Dinner Address

LATERITE WARS

By

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At the ALTA 2011 Dinner, I likened the survival of PAL to a great survivor from the world of movies.....

James Bond.....



**We saw that like Bond, everyone
seemed to be trying to kill off PAL**

but in 2011 it was

STILL ALIVE!!!!!!

**At the ALTA 2013 Dinner, I continued the
story and likened PAL to another great
survivor from the movies.....**

Jason Bourne.....



**Many were still saying that PAL, like
Bourne, was.....**

Dead in the water



**I also said that a new enemy had now
arisen**

AL (Atmospheric Leaching)

**and was attacking in heaps
and tanks using sulphuric acid,
hydrochloric acid and nitric acid.**

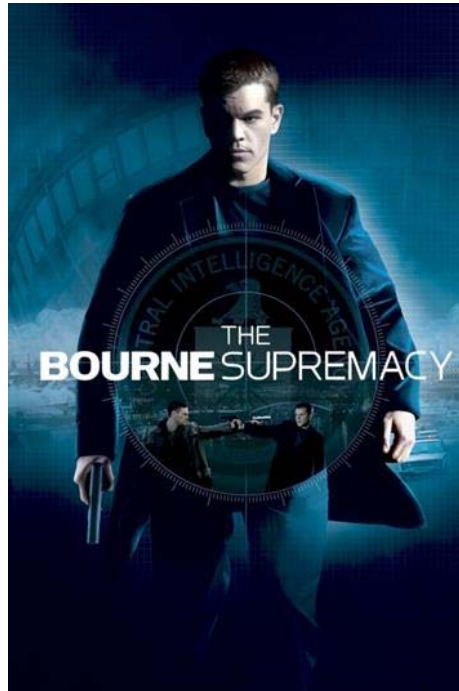
**Alarmingly for PAL, heap leaching
had gained a foothold at Murrin
Murrin (Minara), in Western Australia,
and was threatening at an increasing
number of locations**

Murrin Murrin, Minara



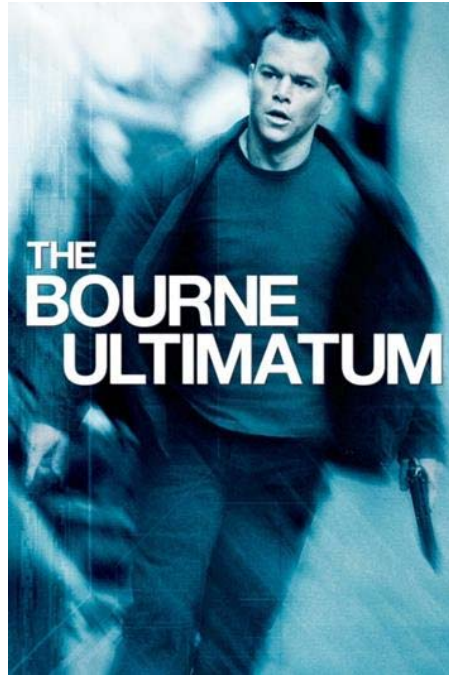
**However, despite the challenges,
in 2013, PAL, like Bourne,
still had the**

supremacy



But was facing an

ultimatum



**that the current projects
must be successful**

Looking back, 2013-2017 has been a period of struggle between PAL and AL, which I am likening to yet another movie series



so I am calling it



**LATERITE
WARS**

**At the beginning of this period
many saw the heap leaching
version of AL as**

A New Hope



However, it proved more difficult than expected, and interest waned, though it is still pursued for a few favourable ore deposits.

In the meantime

The Empire Strikes Back



With two new PAL plants – Taganito (Sumitomo) in the Philippines, and Meta Nickel in Turkey

Taganito, Sumitomo



Gordes, Meta Nikel



**But the war was far from over, and
we saw**

The Return of the Jedi



As heap leaching was replaced by a surge of interest in atmospheric tank leaching.....

**and another menacing enemy
had burst on to the scene in
China, namely.....**

The Phantom Menace



NPI (Nickel Pig Iron)

But living up to the title of the movie, it turned out to be a “phantom” enemy, as it can only produce low grade NPI suitable for 200 series stainless steel from the limonite ores mainly targeted by PAL.

Another serious disadvantage is that it does not recover cobalt, which is becoming a critical item for battery manufacture.

At the same time, various clones of sulphuric acid tank AL systems, as well as chloride and nitric acid based processes, have been developed in readiness for an

Attack of the Clones



and sulphuric acid based AL has progressed to at least limited commercial application

However, PAL is now engaged in the

Revenge of the Sith



**through the development of
valuable by-products –
especially scandium,**

So in 2017 we can now say that

The Force Awakens



as a number of major new projects are developed with scandium as the primary target, as reflected by presentations in recent ALTA conferences including 2017.

Looking to the future, it is not yet clear whether PAL or AL will be

The Last Jedi



**STAR
THE LAST JEDI
WARS**
DECEMBER

Clearly, the Laterite Wars are not yet over, and there will likely be more action with higher nickel price.....

or perhaps it will end in a peace treaty with:

PAL for Limonite

and

AL for Saprolite

So watch this space