

## Quarterly newsletter - July 2012



### Dear Shareholder and Broken Hill Prospecting Supporter,

Welcome to the fourth newsletter for Broken Hill Prospecting Limited ('BPL'). In this issue we provide an update on our work at BPL's Railway Cobalt deposit, explain why cobalt usage is increasing in China and provide a 'non-technical' summary of how we believe our cobalt deposits were created.

Last month I was pleased to report on our very promising drilling results from the new Railway Cobalt deposit discovery. Our exploration has shown that there is excellent potential for a future world-class, open-cut mine to produce sulphide concentrate with considerable cobalt content and potential for bi-product production of sulphuric acid. We have commenced a scoping study to address development options and hope to have this completed in several months. Further details of this work can be found on our website at [www.bhpl.biz](http://www.bhpl.biz).

### Cobalt consumption in China expected to increase

Cobalt is used in many super alloys and hardened steel as well as a wide range of industrial applications. Emerging energy technologies will also require large amounts of cobalt for rechargeable batteries to power the next generation of electric and hybrid cars. At the recent Cobalt Development Institute Conference, held in Vancouver on 30-31 May 2012, a leading China analyst (Ms Xu Aidong) predicted increasing cobalt consumption in China during 2012 and expects this to be 13.8 percent higher than for 2011.

With growing concern of future political insecurity in Central Africa our deposits could become critical to supply cobalt demand

in China, as well as USA, Japan and Europe which have no cobalt resources of their own.



### Big boost to BPL's resource base will help future development plans

The Railway Cobalt deposit is shaping up to be a very large cobaltiferous pyrite deposit. Cobalt mineralisation outcrops at surface and is located beside the main railway near Broken Hill (See Figure 1). Location and size of the deposits will favour a large open cut mine if development was to proceed.

BPL has commenced resource assessment as well as a scoping study to investigate a 7.5 million tonne per year open cut mine with annual production of pyrite concentrate containing about

# Big boost to BPL's resource base will help future development plans continued



Figure 1. Drill rig at work on the Railway Prospect. The main Broken Hill to Adelaide railway line is visible about 500 metres away.

7,000 tonnes of cobalt. If this work is positive, follow-on feasibility studies may lead to development of the resource which would provide an alternative supply to cobalt mines in the Democratic Republic of the Congo (DRC). The DRC produced almost 65% of the world's cobalt in 2011 and security of supply has become increasingly important for large cobalt consumers in the USA, Japan and Europe.

## Possible origin of the cobalt mineralisation? Our model is unusual and interesting

Quite a few shareholders and friends have recently asked how I think our cobalt deposits formed. BPL's team has been working steadily at developing a model that we can use for our ongoing exploration and because I think you will find it very interesting I, decided to devote the bulk of this newsletter to a non-technical summary of how we think the deposits were created.

The rocks containing the cobalt mineralisation near Broken Hill were deposited in a small inland lake or sea about 1.7 billion years ago at a time when the Earth was like an 'alien planet'. At that time, the Broken Hill area was part of a landmass which included the ancient basement of South America, Africa and Antarctica. The environment was very different from the sky, sea and land that we have today.

The atmosphere contained almost no oxygen, and had much higher levels of carbon dioxide, methane and sulphur dioxide. There were no grasslands and forests. In fact no multi-cellular plants or animals existed in the thin, toxic atmosphere which allowed cosmic rays to penetrate.

Life forms were limited to ancient species of bacteria. Temperatures were much lower and ice was widespread. Seas were mostly devoid of oxygen, and were very salty and high in methane and sulphur. Skies were probably coloured orange-red and waters bright green, in contrast to our current shades of blue. Active volcanoes fed sulphur and toxic gasses into the sky. In areas which were not frozen, there was no soil or organic material. Wind filled the sky with red iron dust, and rivers had no life.

Rocks in Broken Hill Prospecting's project area at Thackaringa are interpreted as forming within a small sea basin in this bleak, toxic environment. The basin was probably covered in ice for most of each year and likely contained very saline (sodium-rich) water which was high in methane and sulphate and was stratified with heavier salty water which filled lower parts of sea floor depressions. Early forms of bacteria (and their cousins, archaea) adapted to the dark, saline and oxygen deprived conditions of the small sea and would probably have preferred to live in the deeper water away from

the sun's damaging radiation. Microbes in this environment would almost certainly need the energy from chemical reactions, probably breaking down dissolved sulphate into sulphide, to give them the energy to grow and reproduce.

The ancient microbes almost certainly reproduced quickly, just like the bacteria of today, and may have evolved into species that learned to make small magnets (called magnetosomes) comprised of magnetic sulphide crystals (greigite) arranged in chains within their tiny single-celled bodies (See Figure 2). Greigite magnets have been found in some living bacteria. They enable the organisms to move using the earth's magnetic field to position themselves in briny water where the optimum levels of sulphate and methane allow them to survive and flourish. Using their in-built magnet motors, these modern bacteria can twist and turn to position within bacterial films and floating mats of bacteria suspended in the anaerobic water (See Figure 3).

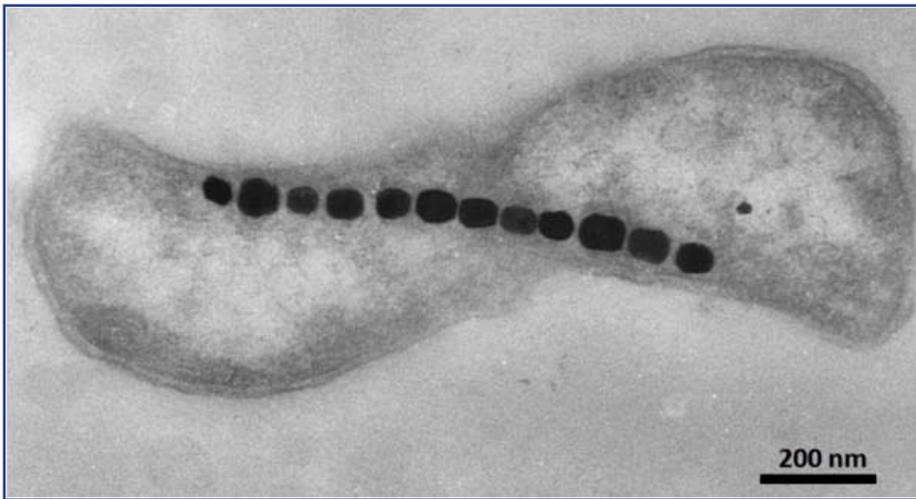


Figure 2. Electron Microscope image of a magnetotactic bacterium showing an elongate chain of magnetite crystals elongated diagonally across the length of the cell. [Source: Chen et al (2010) "Bacteria that synthesize nano-sized compasses to navigate using earth's geomagnetic field" in Nature Education Knowledge 1(10):14].

From time to time, breaks in the ice cover and surface storm activity may have seen wind-blown iron dust and sulphuric volcanic ash settling onto the sea. This debris likely sank to provide nutrients to feed bacterial blooms, which built up slimy masses consisting of many trillions of bacteria cells. As the blooms grew, dead bacteria with magnetic greigite inclusions settled to the sea floor where they accumulated to form a sulphidic mud. The most successful

bacteria species probably adapted a method to incorporate cobalt into their magnetosomes giving them a stronger 'body' magnet and providing a clear advantage in mobility over competitive species. During many hundreds of thousands, perhaps millions of years the sediments on the bottom of the toxic sea floor are likely to have accumulated until they were tens, or hundreds of metres thick. These would have been a mixture of mud and silt, high in sulphide

and sodium. They may have formed a muddy sea bed covering many tens of square kilometres.

After deposition, the sulphide mud turned into rock as it was buried by younger sediment. Later, metamorphism and tectonism altered the minerals, but the rock chemistry remained largely intact. In the rocks that we find today at Broken Hill, we still see some of the original textures and they are similar to those formed in modern lake sediments. Sodium-rich minerals, like albite feldspar, have replaced the sodium rich clays. Greigite has recrystallised into cobaltiferous pyrite and the new metamorphic rock is now called gneiss. Folding and faulting has also occurred and the once flat-lying sea floor mud is now steep dipping, broken and folded as a result of many episodes of tectonic deformation.

Scientific studies in recent years have sampled several modern deep sea floor basins such as the Urania basin in the Mediterranean Sea, revealing strikingly similar modern environments. Highly saline, dark, oxygen-depleted water at depths of almost three kilometres in the Urania basin contain markedly similar chemistry to the water which is thought to have hosted our ancient cobaltiferous pyrite deposits near Broken Hill. Sulphide-producing bacteria float within the dark, briny Urania seawater, and muds dredged from the sea floor by an expedition in December 2011 were rich in sulphide. DNA differentiation of bacteria from the deep Urania water has identified dozens of microbe species and these are concentrated near a geochemical transition zone near the top of the very saline water which ponds in depressions of the Urania basin.

Today's challenge for Broken Hill Prospecting is to unravel the pieces of the ancient Broken Hill basin and put them together, jigsaw-like, to find out more about the size and extent of this fascinating ancient ore-forming system.

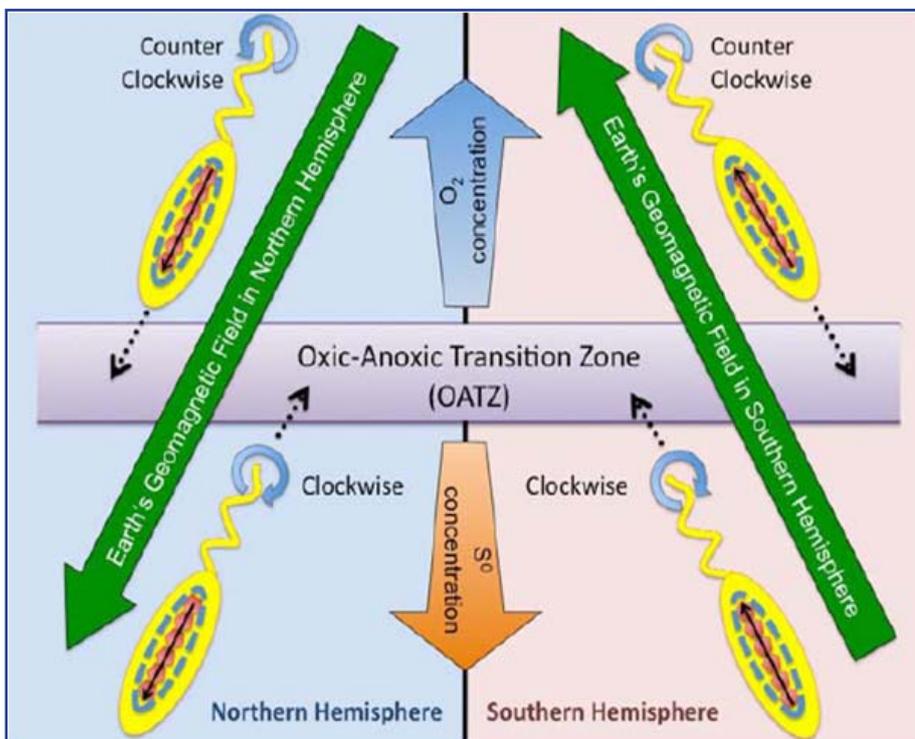


Figure 3. Profile through a typical deep-sea basin illustrating how magnetotactic bacteria are able to swim towards a favourable habitat (OATZ) using the earth's magnetic field. Note the opposite spin directions in different hemispheres. [Source: Chen et al (2010) "Bacteria that synthesize nano-sized compasses to navigate using earth's geomagnetic field" in Nature Education Knowledge 1(10):14].

# Upcoming meetings

Dr Ian Pringle and several of the BPL team will be attending the Australia-China Resources Symposium to be held at the Hilton Hotel, Adelaide on 11-12 July 2012. This will be well attended by China based business groups seeking investment opportunities.

Ian will be presenting a research paper entitled "Thackaringa cobalt deposits, sulphide formation by microbial activity in a Paleopro-

terozoic anoxic brine basin" at the 34th International Geological Congress to be held in Brisbane on 5 – 10 August 2012.

Ian will present an update on the Thackaringa cobalt deposits at the 5th Annual Mining NSW Conference, which will be taking place on 20-21 August 2012 at the Orange Ex-Serviceman's Club, Orange, NSW.

# Resources and Energy Symposium 2012 at Broken Hill

BPL Directors and Consultants attended the Resources and Energy Symposium 2012 in Broken Hill on 20-23 May. Ian presented results of recent drilling at the Railway Cobalt Deposit and displayed some of our drill samples at an exhibition

booth. BPL's staff welcomed the opportunity to discuss the recent drill results and our plans with shareholders as well as locals and investors. We also took a small group on site to visit the project area.

# An excellent opportunity for investors

BPL's cobalt deposits have excellent road and rail access and their proximity to Broken Hill, a well established mining town, will allow BPL to investigate several processing options for future mine development. The Company is well placed to fast track production should growing concerns over future security of cobalt supply lead to rising cobalt prices.

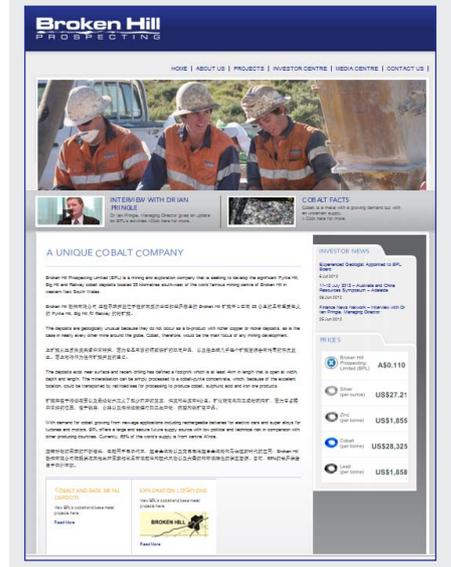
BPL continues to offer an

opportunity to invest in an expanding cobalt market. As a rapidly emerging dual listed company (ASX and NZX Code: BPL), BPL is well positioned to increase its market capitalisation as our projects become known in a market eager for security of cobalt supply.

I look forward to providing regular updates as our assessment work progresses during the next several

# Website update

We have recently revamped our website ([www.bhpl.biz](http://www.bhpl.biz)) to provide up to date drilling and results, future plans, new images and a video of Dr Ian Pringle's recent interview with Lelde Smits from Financial News Network.



months. Please take the time to visit our refreshed website at [www.bhpl.biz](http://www.bhpl.biz) which details all of our recent work results.

Yours faithfully,

Dr Ian Pringle  
Managing Director

### Competent Person and Reporting Statement

The exploration activities and results contained in this report is based on information compiled by Dr Ian Pringle, a Member of the Australasian Institute of Mining and Metallurgy. Dr Pringle is the Managing Director of Broken Hill Prospecting Ltd and also a Director of Ian J Pringle & Associates Pty Ltd, a consultancy company in minerals exploration. He has sufficient experience which is relevant to the style of mineralisation and types of deposits under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the December 2004 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code). Dr Pringle has consented to the inclusion in this report of the matters based on his information in the form and context in which it appears.

Reporting of resources was undertaken by Hellman & Schofield Pty Ltd ('H&S') and these are reported in accordance with JORC Code (2004) standards. H&S quantified a potential target size within the modelled mineralisation envelope and this potential lies outside of the Inferred Resource because of the absence of nearby drilling. This target is conceptual in nature and more drilling is required to further define it. There is no certainty that this target will result in a Mineral Resource.

### Website

The Company has recently reformatted and updated its website [www.bhpl.biz](http://www.bhpl.biz). Please visit our site for links to recent news, video interview, metal prices, share prices as well as project and company information.

### For further information contact

Dr Ian Pringle, Managing Director, Broken Hill Prospecting Ltd +61 408 548 767  
Australian media - Alan Deans, Partner, Last Word Corporate Communications +61 427 490 992



Level 14, 52 Phillip Street, Sydney NSW 2000  
Box 3486 GPO, Sydney NSW 2001  
P: +61 2 9252 5300 F: +61 2 9252 8400 E: [info@bhpl.biz](mailto:info@bhpl.biz) W: [www.bhpl.biz](http://www.bhpl.biz)