

## Royal sees upside in changing iron ore market

*As pollution in the skies of major Chinese cities continues to worsen, the Chinese Government has stepped up its efforts to reduce the impact of polluters. Recent media reports have stated that larger polluters are being forced to clean up their act or close down their operations under strict new environmental measures.*

With increasing regulation from the Chinese Government, demand growth for iron ore is expected to shift from low-grade hematite to premium magnetite, which is considered more environmentally friendly. Some of the most polluted areas of China have been in Hebei Province, where cities have measured up to 15 times the level of PM2.5 (particle matter of 2.5 micron) per cubic metre the World Health Organisation would consider hazardous.

One of the major polluters has been the steel industry, which burns coal in the process of turning iron ore into steel. A main cause of pollution is sintering of low grade 'hematite fines' (dust size particles 62% Fe or below), which requires large amounts of energy through the burning of coal and produces highly toxic emissions. Sinter plants agglomerate iron ore fines (dust) with other fine materials at high temperature, to create a product that can be used in a blast furnace. The quality of hematite fines used in the sintering process has steadily decreased over time, as supply for good quality fines dries up and as a result pollution levels have risen.

The two big winners in this unfortunate environmental problem are the producers of hematite lump, and the producers of magnetite. Lump (hematite material bigger than 7mm) can be fed directly into the blast furnace without the need for the high polluting sintering process. However, quality lump supply is limited to the likes of BHP, Rio and Vale and is attracting a premium price.

The alternative to using lump is the use of magnetite, which is the major ore type at Razorback. Magnetite can be made into a



Skies over downtown Shanghai, Dec 2013  
(The Guardian, 26/02/14)



Steel plant, Hebei Province (Irish Times, 18/04/14)

pellet or even added to sinter to improve its quality. The advantage of magnetite in the blast furnace is that it releases heat (exothermic) rather than absorbs heat (endothermic) like hematite, therefore saving up to 40% in energy. In fact, for a steel mill, each tonne of magnetite concentrate saves about 172 kg of CO<sub>2</sub> emissions compared to DSO fines\*.

This change in steel mill demand will see a change in the pricing dynamics of iron ore, with higher grade material like Razorback magnetite receiving a greater premium price compared with hematite fines.

\*Independent report by the Crucible Group,  
[www.magnetitenetwork.com.au](http://www.magnetitenetwork.com.au)

### Key 2014 Dates

#### Quarterly Reports

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### Royal spotlight

*Royal Resources teams up with Braemar Infrastructure on South Australian iron ore export solution. See p2.*



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# What is Braemar Infrastructure?

**During September 2013, Royal announced that it had entered into a Memorandum of Understanding with Braemar Infrastructure Pty Ltd (BIPL) to collaborate in the development of an iron concentrate export solution for the Braemar Region. BIPL is a private company that plans to supply infrastructure to the Braemar area.**

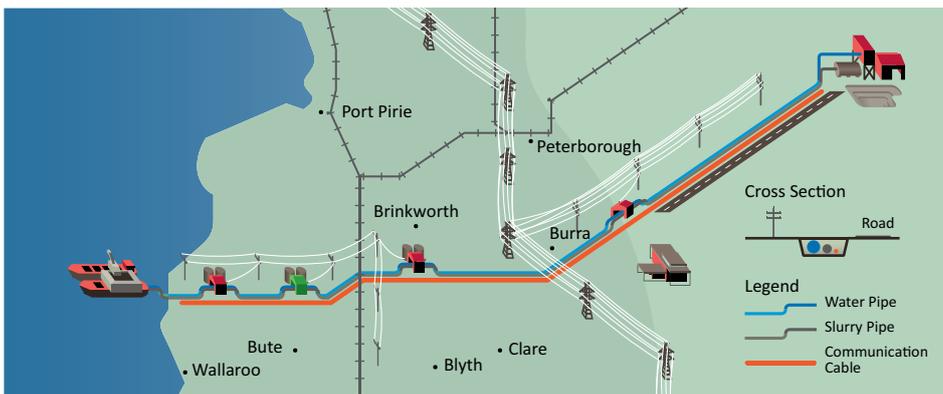
This is an area which BIPL believes has the potential to be the next Pilbara, in regards to supplying the world with iron ore. The Chairman of BIPL is Gordon Toll, a former Chairman of Fortescue Metals, who has extensive experience in iron ore and associated infrastructure projects. Loadstone, another company Gordon is involved in, is also a major shareholder of Royal, with a 22.5% interest in the company. Gordon sees a big future in the area and as such, Loadstone has its own magnetite prospective tenements.

**What is the advantage of a partnership with BIPL?** BIPL's plan is to supply a multi-user infrastructure facility, which will provide Braemar miners with a buried slurry pipeline to the coast to transport the magnetite concentrate. Along the same corridor, an additional pipeline would supply water from the coast for ore beneficiation, as well as power transmission lines, high-speed communication cables and an access road.

Approximately 4km off the coast, north of Wallaroo, a vessel would store and offload the ore to a cape-size vessel, eliminating the need for a costly new port or inefficient transshipment.

While Royal had originally planned a similar method of transport and offshore offloading of its material in its prefeasibility study, there are several advantages of the BIPL solution. Importantly, it would reduce the CAPEX of Razorback by over \$1 Billion, and thus dramatically reduce the capital intensity of the project. The significant reduction in CAPEX would make the Razorback project one of the lowest capital-intensive magnetite projects in the country. A multiuser facility should have significant cost saving benefits in OPEX and a single infrastructure corridor would reduce the environmental footprint, making it more attractive to Government regulators and local stakeholders. A multiuser export solution would help the Braemar Region develop its own brand of high quality magnetite ore.

Royal is the first of the Braemar Region magnetite developers to enter into a Memorandum of Understanding with BIPL. Royal regularly meets with BIPL to discuss the progress of both Razorback and the Infrastructure corridor and to identify potential synergies to accelerate the development process.



## Bethany Lawrence

Senior Geologist:

**A Royal in the family...**

### Royal Resources has a Royal connection!

The exploration team includes a geologist, Bethany Lawrence who holds Honours in Applied Geology from the University of South Australia. Bethany has been exploring for various commodities in many localities, including the Tanami and Pine Creek regions of Northern Territory, the Olary, Gawler and Barossa regions of South Australia and the Fraser, Yilgarn and Pilbara regions of Western

Australia. Bethany claims to be a descendant from the Plantagenet Line of Kings. Coincidentally her great, great grandfather carried into Australia in 1871 "a pair of 16 bore guns and a geologist's hammer".\* Bethany continues the passion for rocks and cartridges. She has worked for Royal for over five years and a large amount of her time has been spent at Razorback, where she's often been in charge of field work.

\* Quote from autobiography



## Gav's Grazings

I have been working on the Razorback project since Royal made the acquisition in 2009 and have certainly seen it come a long way. A positive review of our optimised PFS work has recently been completed and the team at Royal is now feeling a new degree of confidence going into the next level of work required for the feasibility study.

The Royal team has been busy working on mine permitting, as well as some geotechnical work, which we hope will assist in further assessing the use of surface miners for part of the mine operations. In addition, we are re-examining the Iron Peak area of the project that sits outside the Resource. While we do not require more tonnes, having Resource tonnes closer to the proposed beneficiation plant, does have significant cost benefits associated with reduced haulage. Some of the highest drill intersections in the Resource were returned at Iron Peak and any additional drilling could be completed during the Feasibility Study stage and integrated into the mining plan.

While Marcus is temporarily out of action the Directors, Phil, Frank and Mal have taken on a greater 'hands on' role in securing funding to accelerate development of the project. The financials of the Project have never looked better, so the Board is feeling confident that we will find the right partner.

Also I would like to congratulate Royal employee Inthu Siva and her husband Sivan in the birth of Teshwin during February. He and the mother are doing fine (except for a little lack of sleep at night).

Get well soon Marcus.

**Dr Gavin England**  
Chief Geologist and  
Project Manager

If you have any comments or you have any questions email me.

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