



MiningMaven  
WIRE



## Moonta: Closing in on more than half a million tonnes of copper?

EnviroCopper is a privately run mining company, which is seeking to develop the Kapunda and Moonta copper projects using an extraction method call “in situ-recovery” (“ISR”). Thor Mining Plc (LSE:THR) has the right to purchase a 30pc stake in EnviroCopper, which is pioneering the application of ISR in copper mining operations in Australia. ISR is a highly cost effective and environmentally more friendly extraction method compared to traditional mining.

This MiningMaven Wire provides an update to the main EnviroCopper report published in June 2019, following release of the initial mineral resource estimate at Moonta in August 2019. The full report can be read [HERE](#).



LSE:THR

EnviroCopper Update  
September 2019

## THOR Mining Plc Share Price 2018/19



### Market Data

EPIC	THR
Current Share Price	0.585p
52 Week High	2.25p
52 Week Low	0.475p
30MA Volume	3,224,727
Market Cap	£4.8m
Shares in issue	822m
Market	AIM



Source: LSE

### Update at Moonta

On 15 August 2019, Thor Mining released details of its first estimated copper resource for the Moonta Project. The official announcement ([HERE](#)) contains a full technical description of the initial resource estimate, including details of the methods and analysis applied. It also describes a number of the physical conditions that are present at Moonta, which indicate the project is amenable in-situ recovery (“ISR”). In this MiningMaven Wire we examine the report’s highlights and take a look at some comparative ISR copper projects.

### Moonta Overview

On 05 March 2019, Thor announced ([HERE](#)) that EnviroCopper is targeting an ISR amenable target of between 428,000 and 713,000 tons of contained copper at Moonta. The results from the initial copper resource have taken the project towards meeting that goal.

Moonta now covers three identified copper deposits; Wombat, Bruce and Larwood. All three deposits are on freehold land, meaning that there is no Native Title claim. This should make any future permitting a more straightforward process.

Preliminary metallurgical test work at Moonta has confirmed that the copper present is amenable to leaching, which is a necessity for any future ISR operations. Not only that, but so far no non-copper bearing minerals, such as carbonates that might consume ISR leaching, have been observed. This is an encouraging sign for any future application of ISR.

As for the initial Moonta copper resource estimate, EnviroCopper engaged mining expert Mining Plus to prepare the JORC report. Mining Plus’ assay work analysed 164 holes, previously drilled at Moonta. There are a further 308 already-drilled holes still to be analysed. This creates obvious potential for a relatively straightforward improvement for Moonta’s published economics.

Those numbers themselves were encouraging. Mining Plus’ initial Inferred mineral resource estimate for Moonta “was 66.1 million tonnes (MT) grading 0.17% copper (Cu), containing 114,000 tonnes of contained copper, at a cutoff grade of 0.05%Cu.”

## Moonta Copper Mineral Resource Estimate JORC 2012

Resource Classification	COG (Cu %)	Deposit	Volume (Mm3)	Tonnes (Mt)	Cu (%)	Cu (metal Kt)	Au (g/t)	Au (kOz)
INFERRED	0.05	Wombat	20.91	46.5	0.17	80		
		Bruce	5.51	11.8	0.19	22		
		Larwood	3.48	7.8	0.15	12	0.04	10
<b>Total</b>			<b>29.9</b>	<b>66.1</b>	<b>0.17</b>	<b>114</b>		

Source: Thor Mining Plc

The initial resource estimate was in the “*Inferred*” category because of the wide spacing between drill holes. To be able to make a Measured or Indicated classification, Mining Plus required greater drilling density. Mick Billing, CEO of Thor, commented on this:

“ With cores from 308 drill holes still to assay at Moonta, EnviroCopper is going to focus on the low hanging fruit first. This will give us the potential to expand our inferred mineral resource estimate, hopefully later this year.

Once we have results from this work, then EnviroCopper will be able to make a decision on its drill programme for 2020. Although this is still to be confirmed I expect that one of the key areas of attention will be to target drill holes, which stand a higher probability of helping us upgrade our the categorisation of at least part of our Inferred resource to Indicated or even Measured. ”

Building on this point and it is also worth noting that the Wombat, Bruce and Larwood deposits all remain open along strike or at depth. These provide EnviroCopper with additional possibilities of identifying further mineralisation at the trough extensions, beyond that which has already been discovered.

In the RNS, Thor noted:

“ The hydrological characteristics of the troughs are positive, with the mineralised material identified as being porous and likely permeable. The troughs are bounded laterally by fresh and impermeable bedrock that form natural aquacludes. ”

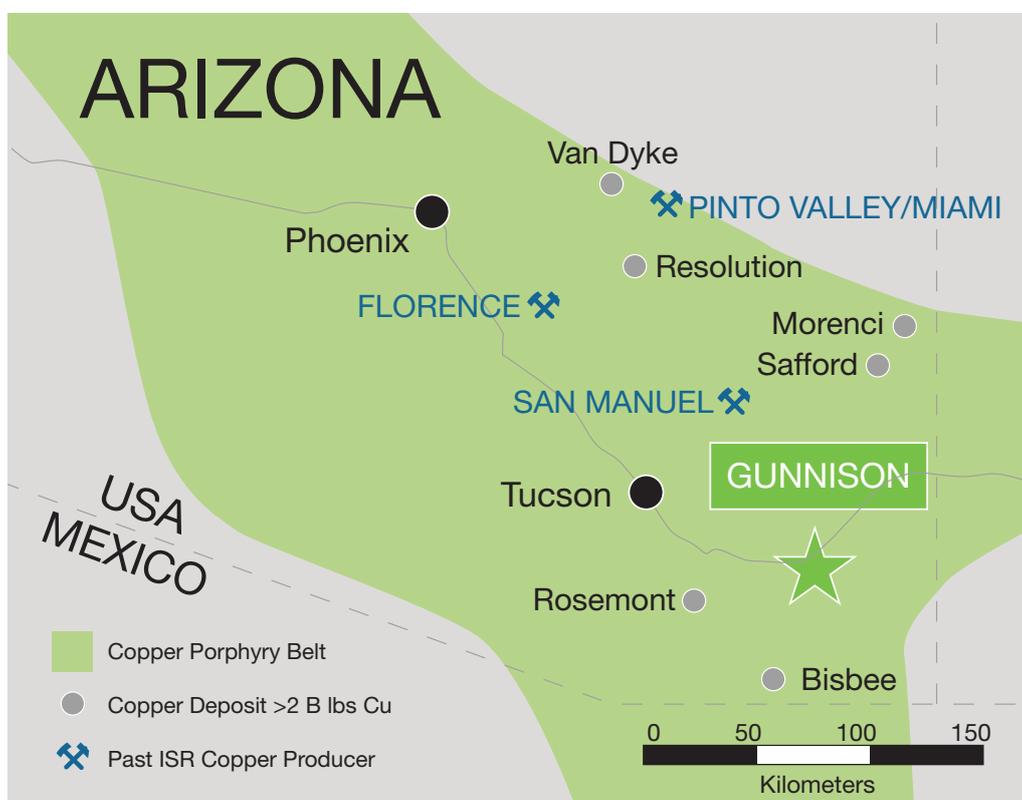
## Comparative ISR projects in Arizona

To help put into context the initial mineral resource estimate at Moonta, it is worth considering other similar ISR projects around the world.

Specifically, there are currently two large active ISR copper developments in Arizona, USA. These are the Gunnison Copper Project, operated by Excelsior Mining Corporation (TSX:MIN), and the Florence Copper project, operated by Taseko (TSX:TKO). Helpfully, both companies are listed so have released a lot of technical information, which acts as a useful benchmark to assess EnviroCopper’s potential.

Both Excelsior and Taseko have released NI 43-101 compliant feasibility studies for Gunnison and Florence respectively. National Instrument 43-101 (“NI 43-101”) is the standard national instrument used to define mineral projects in Canada. It is equivalent to the Australasian Joint Ore Reserves Committee (“JORC”) standard, which EnviroCopper is using to validate its resources and future potential reserves.

### Position of Florence and Gunnison ISR Copper Projects



Source: Thor Mining Plc

The table below provides a comparative overview of the anticipated headline economics for Gunnison and Florence.

### Overview of Gunnison and Florence ISR Economics

Project Name	Copper Price Deck	NPV7.5	IRR	All-in Production Cost	Cap-Ex	Mine Life	Copper Production
Gunnison	US\$2.75/lb	US\$807m	40%	US\$1.23/lb	US\$49m Initial	24yrs	2.2bn pounds
Florence	US\$3.00/lb	US\$920m	44%	US\$1.10/lb	US\$200m Total	20yrs	1.7bn pounds

Source: Thor Mining Plc

Perhaps the most significant figures to note are the all-in production costs for each project. As Billing put it to us one of the crucial advantages of ISR is that:

“ The cap-ex requirement is very low compared to traditional mining operations. There is no need for big equipment or lots of people. There is no need for a tailings dam and the engineering required for that. Instead all of this is replaced by a relatively small amount of surface plant and equipment and for holes to be drilled into the ground to allow the ISR process to work. ”

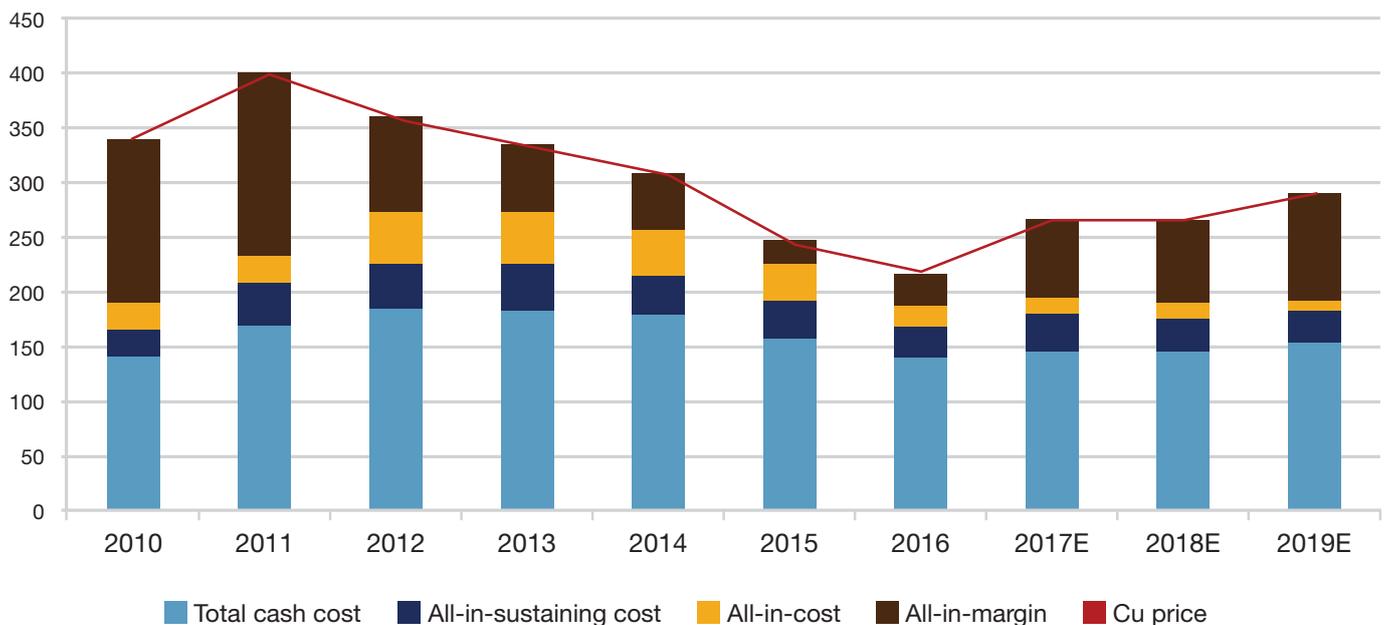
This view is reflected in the anticipated all-in production costs for both Gunnison and Florence. At Gunnison this figure is expected to be US\$1.23/lb of LME grade cathode copper, while at Florence the number improves to US\$1.10/lb.

By way of comparison, according to S&P Global Market Intelligence, all-in production costs for more traditional copper mining companies has been between US\$1.70/lb and US\$1.94/lb since 2016.

With the current spot price for copper is US\$2.55/lb. a 2-year low, this further emphasises the robust economics and potential profit margins a successful ISR project could deliver.

The full Gunnison Feasibility Study can be found [HERE](#) and the full Florence Feasibility Study can be found [HERE](#).

**Changes in costs & margins of the copper industry since 2010**



Source: S&P Global Market Intelligence

## Next Steps

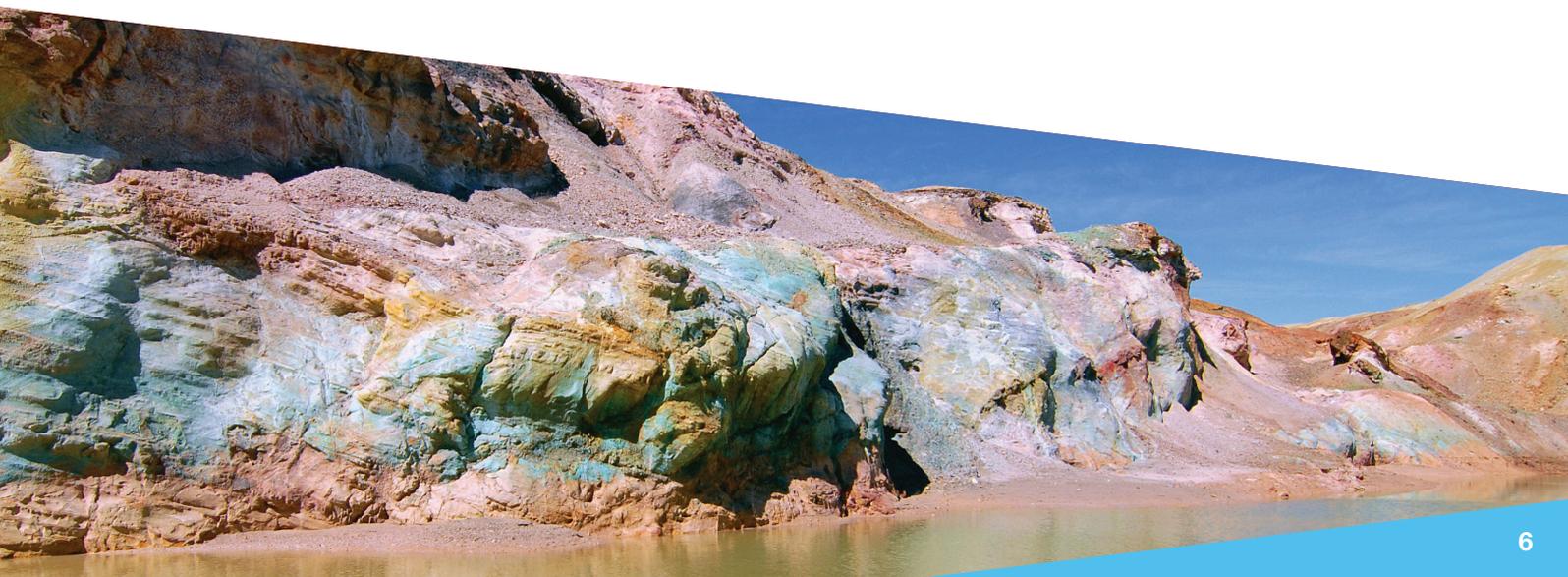
Describing the next steps for EnviroCopper Billing told us:

“ Kapunda is the project closest to generating revenue. We expect to complete the feasibility study in the next 18 months and to follow this with a process of securing the necessary licenses and regulatory approvals. We will also seek to secure the project finance to bring Kapunda into production and initiate the first ISR operation.

Further drilling is planned at Kapunda in September and October. One of the areas we will also be focussing on in this campaign is the potential for including a gold resource in a future economic update. Our initial analysis suggests that the ISR technique could be amenable to extracting gold here too, as we believe it could be hosted in a dissolvable form. However, we need to prove this up before commenting further. ”

As for Moonta, Billing went on to say:

“ We will continue to prove up the resource at Moonta and expect to release an update on this before Christmas. So far we have only assayed 164 holes of the 308 that have been drilled. We need to complete assays on the remain 124 holes, before committing to the next drill campaign here. Our aim is to start drilling again at Moonta in early 2020, but this is a decision that EnviroCopper will need to confirm. ”



## Disclaimer

Author: Ben Turney

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## Contact Us

To find out more please contact Ben:

**Email:** [info@miningmaven.com](mailto:info@miningmaven.com)

**Telephone:** +44 (0) 208 226 5175

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