

# Research Focus into Possible In-Situ Recovery of Copper mining at Kapunda Mine Site

Cr Deane Rohrlach 5/2/19

**Note: The information in this article (written in my role as Chair of the Kapunda Business Alliance) is as accurate as I can make it but it is not an official Council document. Any errors are mine**

## Mining in general

If you live in a house, use any form of transport, use anything that runs on electricity, wear clothes, or rely on medical intervention, then you are saying by your actions that you support mining, because none of these would be possible without it.

## Possible recommencing of mining in Kapunda

**The question then becomes** "Can mining occur at the Kapunda Mine Site in an environmentally safe way, that does not impact on nearby residents due to excessive noise (e.g. blasting, loud machinery), significant amounts of dust or extensive ugly, highly visible structures, and which does not compromise the tourism and heritage aspects of the mine site?"

## Supplementary questions:

- Assuming the answer to the question above is yes, is there a worthwhile economic benefit to the Light Regional Council area if mining occurs?
- If the above answers are yes, can it be done in a financially viable manner?

Deciding the answer to these questions involves a very thorough, systematic and rigorous one to three stage process with roles played by Council, The Government and the mining company - Environmental Copper Recovery (ECR). The first stage is a research stage and information discovered in this stage will determine if ECR proceeds to the next two stages (Application for a Mining Lease and preparation of a Program for Environmental Protection and Rehabilitation (PEPR). The research stage is being informed by a \$2.85 m Commonwealth Govt. Research Grant. The research is being conducted by CSIRO and Adelaide University experts.

## Council

Since the mine site is owned by Council and zoned as recreational land, Council needs to provide a waiver to allow any mining related activity (including testing) to occur on the site. However, Council cannot make an arbitrary decision based on pre-conceived notions for the following reasons:

- The Councillor Code of conduct that is binding on all Councillors, requires councillors to be unbiased in their decision making, i.e. requiring them to consider all relevant facts and arguments before deciding and not decide before this occurs.
- Council must also support Government Strategic Priorities, one of which is to triple copper mining output by 2030, which means it needs to support careful investigation to see if copper mining can occur while satisfying the conditions outlined in paragraph 2 above.

## Government

If the results from the Research Phase suggest it is worth applying for a mining lease, there is a long and rigorous step by step government mandated process, covering environmental and all other aspects that must be satisfactorily negotiated before approval to mine is given. Failure to satisfy any of several requirements would mean approval to mine would not be given. The chart at the end of the paper shows what is involved in these two stages

## Mining Company

ECR has responsibility for the research phase. I believe the \$2.85 m Federal Government Research Grant is valuable because it ensures highly skilled researchers provide independent answers to key environmental and other questions, so there can be no perception that results are slanted due to financial self-interest. All the research into what is underground in the mine site and the movement of ground water will be of great benefit to Council, even if mining does not occur.

It is also responsible for determining if the project is financially viable. If the research stage suggests proceeding to mining, ECR is responsible for all the paperwork for the Mining Lease application and Environmental Protection program, in what is a very rigorous, step by step process with extensive mandated community engagement at several stages. I think it is safe to say that mining will not proceed if any uncontained threat to the environment is identified.

## What I have done to date

I have made it my business to understand as much as I can about the proposed mining and its likely impact if it proceeds. To this end I prepared a list of questions I wanted answers to, circulated them to Councillors and staff and sent a copy to ECR. These formed the basis of a presentation Leon and Philippa Faulkner made to the Kapunda Business Alliance and the basis of several questions in the Q and A section of the ECR website.

## Answers to date

From the questions I have asked, and answers received I have learnt the following:

## Likely duration of mining activities if mining is approved

Given the estimated amount of copper available to be mined (119,000 tonne, of which 70,000 to 80,000 tonne may be extracted) and the anticipated rate of extraction, the expected duration of mining activities would be around 7 years, after which infrastructure would be removed, the site returned to what it was before, and infrastructure moved to another suitable site elsewhere.

### **Mining Process**

The in-situ recovery (ISR) process involves drilling a pattern of up to 5 150 mm diameter bores at approximately 20 m spacing to a depth of 120 m, injecting a leaching solution (called a lixiviant) down some and extracting the solution, now containing dissolved copper from the extraction bore at a rate slightly greater than the injection rate (to ensure a flow towards the extraction bore) and transporting this via a pipe to a processing plant (which may be in the nearby industrial zone) where the copper is extracted. The water is then re-used as the cycle continues. At any one time there would be a bore field operating, containing most likely between 10 and 20 bores (the actual number is yet to be determined). Visible infrastructure would consist of the bore heads, each of which is small and not very intrusive, a Well House (standard 12 ft shipping container), and some pipe work, which may be buried where it needs to be.

### **Environmental safety**

Measurements show the water in the mine has high levels of dissolved copper (roughly 300 ppm) and that of the Light River and surrounding aquifer is very low, suggesting the water in the mine is contained relatively well by rock with low permeability. Further work needs to be done to confirm this and I understand the research project will provide more definitive answers.

The lixiviants likely to be used include glycine, sodium thiosulphate and dilute acetic acid (vinegar). These are environmentally friendly and biodegrade. Mining won't be permitted to occur, however if there is a risk of these contaminating the aquifer and there are several safeguards that would be required to be in place to ensure this does not happen.

### **Noise**

I understand it has been established that the proposed mining area will largely be within the current fenced off area of the mine, and there are enough fractures and tunnels to ensure ready passage of the lixiviants, so no blasting will be needed to fracture the underground area. The only noise will be a faint hum from pumping of lixiviants and low-level noise coming from the processing plant. I would expect nearby property owners would not notice any change in noise levels, but this is yet to be confirmed.

### **Visual Impact**

As outlined above, the visual impact of the infrastructure is likely to be minimal and likely to be located where it will not impede tourism activities. Further information on this is needed and will occur as the step by step process continues. Once the mining operation is completed, there is likely to be little evidence that it occurred.

### **Dust**

Because of the nature of the mining operation, dust arising from mining operations should not be visible at any time. There'll be minimal dust during bore installation and no dust at all during mine operation.

### **Bore Drilling**

This may be one of the more intrusive operations and may require temporary restrictions in some areas while it is occurring. There are very strict guidelines that must be followed to minimise negative impact during drilling operations.

### **Heritage**

ECR have met with State Heritage on site and I understand they have determined that the proposed mining operations will not negatively impact on the heritage aspects of the mine and will not encroach on the western side of the site, where much of the remaining infrastructure and tourism development is situated. They require an archaeologist to be on site any time any aspect of the site is likely to be disturbed.

### **Tourism**

From the time I first heard of this proposal I thought it had the potential to provide a tourism boost for Kapunda, provided it was environmentally safe and did not compromise existing heritage and tourism assets of the mine. Kapunda Mine was the first Copper mine in Australia and the first commercially viable metal mine, it had the first open cut copper mining operation, and if the In-Situ Recovery process can be implemented successfully, it should increase visitation to the area. It would be another first for Kapunda – the first use of the environmentally friendlier in-situ recovery of copper process in Australia.

As such, it would be likely to attract professional visitors interested in the mining operation itself, as well as tourists who would be able to see past and present mining operations in the one area, with the experience enhanced by appropriate signage.

### **Employment opportunities**

Light Regional Council covers a large area, and it is likely a significant proportion of jobs would be filled from people from this area, particularly given ECR's commitment to employ local contractors where possible. Their actions to date have demonstrated they are genuinely committed to using local contractors and suppliers where possible. Job numbers, although not huge (possibly around 20 to 25), would provide benefit to local employment.

## Conclusion

While there is still much work to be done to get final definite answers in many areas, I believe preliminary information suggests the careful, step by step process currently occurring should continue, with Council continuing to provide the necessary waivers with any appropriate safeguards to allow this to occur. The result of this process should result in a clear-cut decision as to whether an application for a mining lease (and subsequent operation plan) would be lodged with State Government.

The mining lease application process is rigorous and robust, with mandatory community engagement and public consultation with concerned stakeholders (council, public and government). It is conducted in the public space with oversight by the various government departments (DEM, EPA, DEW and Heritage). This stage is where public opinion is best voiced and will get the best hearing. The diagrams below are taken from Government guidelines MRGM2A and MRGM2B available from the DEM website.

I have had considerable contact with Leon and Philippa Faulkner of ECR in my quest for comprehensive answers to my questions and have on every occasion been impressed by their open and honest approach and willingness to listen to concerns and address these. They are happy to engage with members of the community at any time.

The table below outlines the mandatory requirements for Mining Proposal (MP) and a Program for Environmental Protection (PEPR), and the Mining Act 2 stage assessment process.

**Table 1 Content required for MPs and PEPRs for metallic and industrial minerals**

Content of a MP (MD 006 and Mining Regulations 2011)	Content of a PEPR (MD 005 and Mining Regulations)
Description of the existing environment	
Description of proposed mining operations	Description of mining operations
Consultation	Consultation
Environmental impact assessment	Environmental outcomes including mine completion outcomes
Measures to manage impacts (control strategies)	Strategies for achieving the outcomes
Statement of proposed environmental and mine completion outcomes	
Draft measurement criteria for measuring achievement of the outcomes	Measurement (compliance) criteria
Draft leading indicator criteria	Leading indicator criteria
	New environmental impact assessment (if relevant)

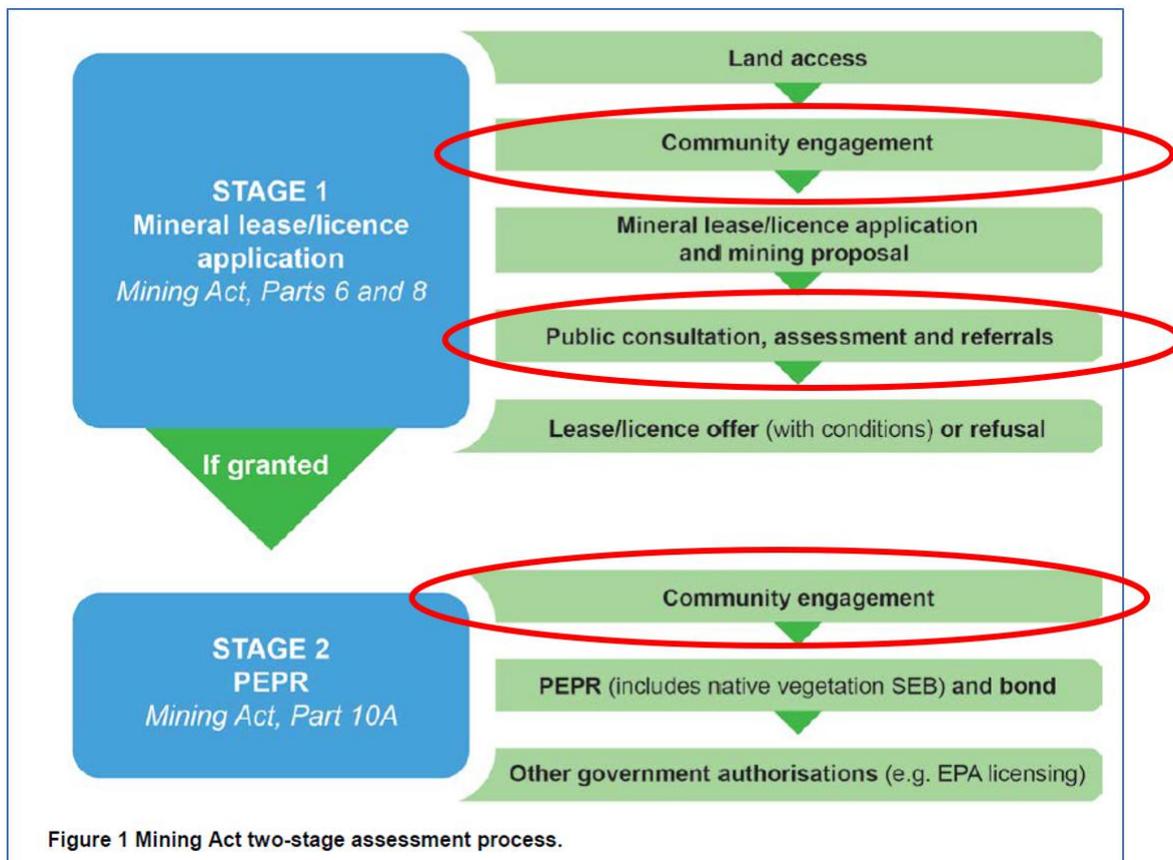


Figure 1 Mining Act two-stage assessment process.