

COB – Regeneration MOU

Webinar

Dr Helen Degeling

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ASX: COB



Cobalt Blue: metals for positive impact

Our 'mine-to-battery-markets' strategy aims to provide a reliable supply of responsibly sourced battery metals that are essential to the Global Energy Transition.



Introducing Regeneration

Regeneration is a mine restoration and closure company

- Aims to restore and renew biological and ecological systems... through full value mining and other innovative methods
- Producing responsible minerals for the energy transition, green tech and sustainable brands
- Launched in 2021 with \$2million US investment by **Rio Tinto**; **Apple** and **Mejuri** are founding partners and funders
- Several sites already under assessment with other partners; previous success with **Salmon Gold™**
- Public benefit corporation (B-Corp), with **RESOLVE** (NGO) as parent organisation

“Brands, consumers, and investors are seeking biodiversity, community, and climate positive minerals.”

– www.regeneration.enterprises



An MOU for collaboration



Seek to partner on legacy sites where Cobalt Blue's patented technology and expertise can be applied



Work with each other and legacy site partners to achieve the aim of ethical metal production paired with positive environmental and social outcomes



Share networks, knowledge and expertise to further the collaboration

NEXT STEPS



Kick-off meetings underway to establish a short-list of potential projects under the collaboration

Regeneration in Australia:



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Global Mine Waste Opportunity

Globally

- 10-13 billion tonnes mine waste is produced annually around the world, adding to an estimated 200 billion tonnes of waste already produced¹.
- Companies avoid rehab due to the huge cost.

Australia

- >10,000 active and inactive sites, with 240 mines expected to close by 2040².
- Cost of mine closure predicted to reach \$8 billion in 2030².

North America

- >114,000 active and inactive mine sites³.

1. Valenta et al 2023 and Franks et al 2021

2. CSIRO (2023) Enabling mine closure and transitions: Opportunities for Australian industry. Prepared for CRC TiME. CSIRO, Australia

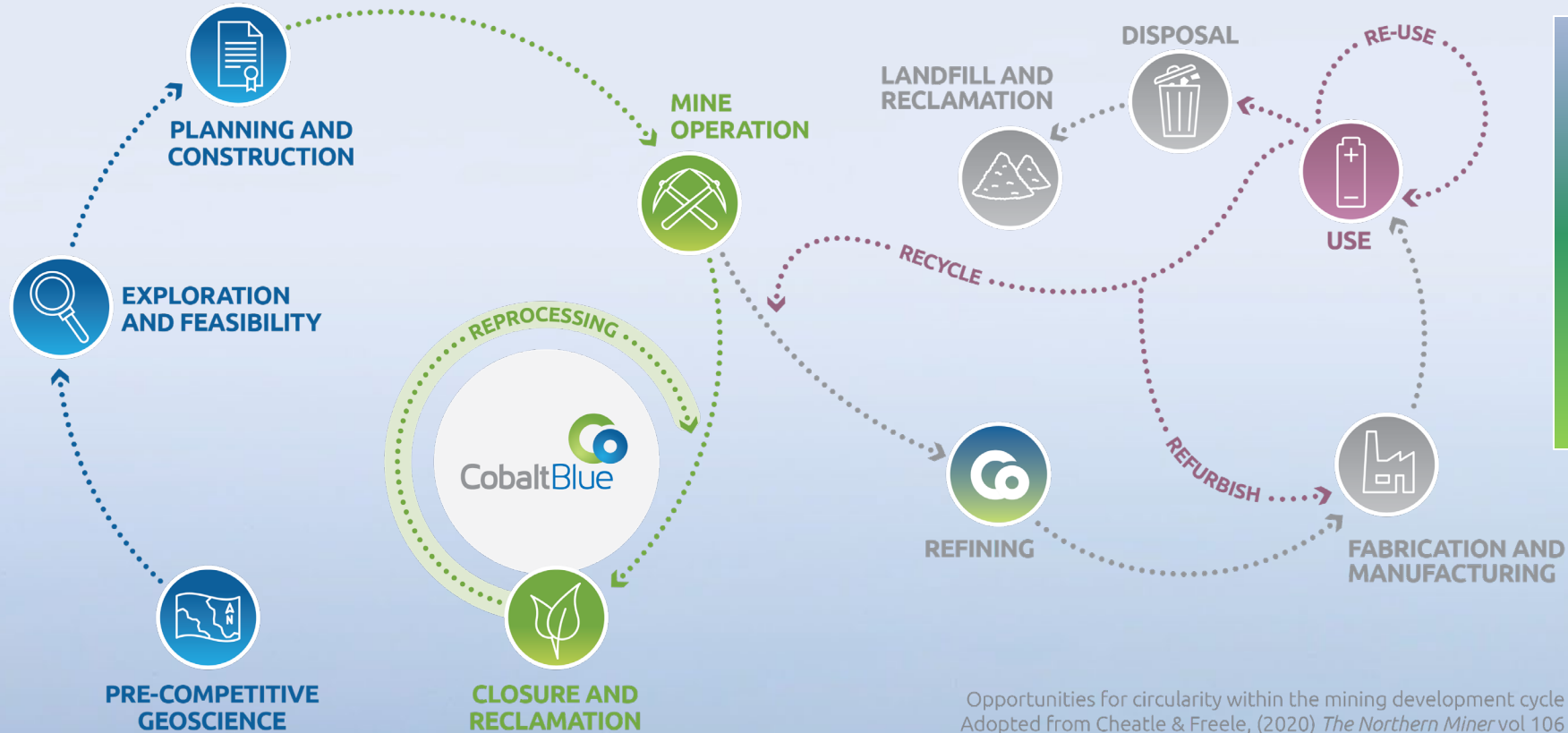
3. <https://mrddata.usgs.gov/usmin/map-us.html#home>
<https://spatialsk.maps.arcgis.com/apps/dashboards/780a4bc0aa524cc38e10a4699bc3511e>

“~10 billion tonnes of tailings produced worldwide in 2018.”

– International Council on Mining and Metals, *Roadmap for Tailings Reduction*, 2022



Bringing circularity to a linear industry



The COB Waste Streams Project is re-thinking how we extract metals.

This has a huge impact on how the mining industry contributes to economies, communities and global supply chains.

Opportunities for circularity within the mining development cycle
Adopted from Cheatle & Freele, (2020) *The Northern Miner* vol 106



The Case for Tailings Re-Processing

The problem

Traditionally, mine waste such as tailings is considered a liability. Employing circular economy principles redefines the liability into a valuable asset which can be recycled, repurposed or reprocessed and reduced.



The opportunity

Re-processing sulphide mine waste allows discarded metals to be recovered, leading to ethically sourced metal and sulphur products whilst reducing the potential for environmental harm. In addition, international legislation such as the IRA and CRMA mandate domestic production of a variety of critical minerals, many of which can be found in the mine waste of traditional operations, making this an ideal source of much needed material for the energy transition



Our know-how

Our extensive experience and proven ability to think outside the box ensures we can create value from waste through bespoke solutions, whilst optimizing for positive environmental outcomes.



Creating value

Concepts of value are evolving from traditional economic philosophies, to include the importance of the natural environment. We can extract metal whilst also de-sulfidising the remaining material, leading to restoration of habitats and waterways and reducing environmental liabilities.



Acid Reduction

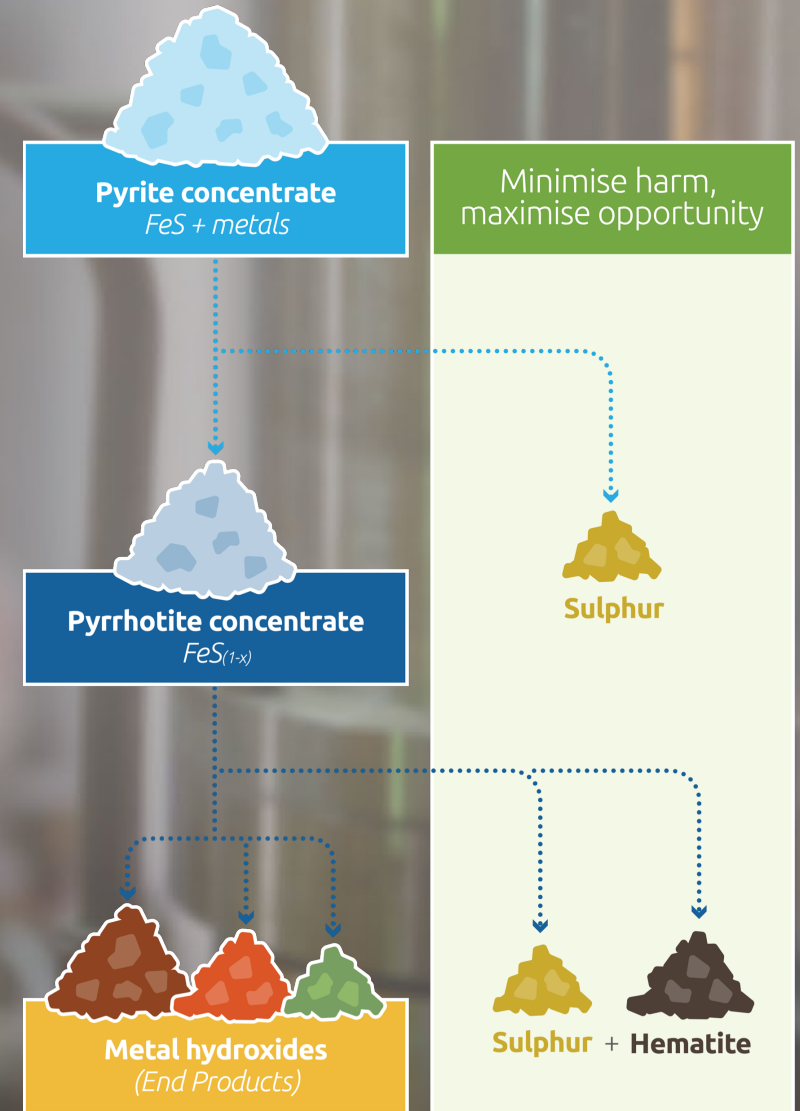
Cobalt Blue's patented process mitigates potential environmental harm and produces saleable elemental sulphur

A key step in the Cobalt Blue process is to convert pyrite (FeS) to the mineral pyrrhotite (FeS_(1-x)).

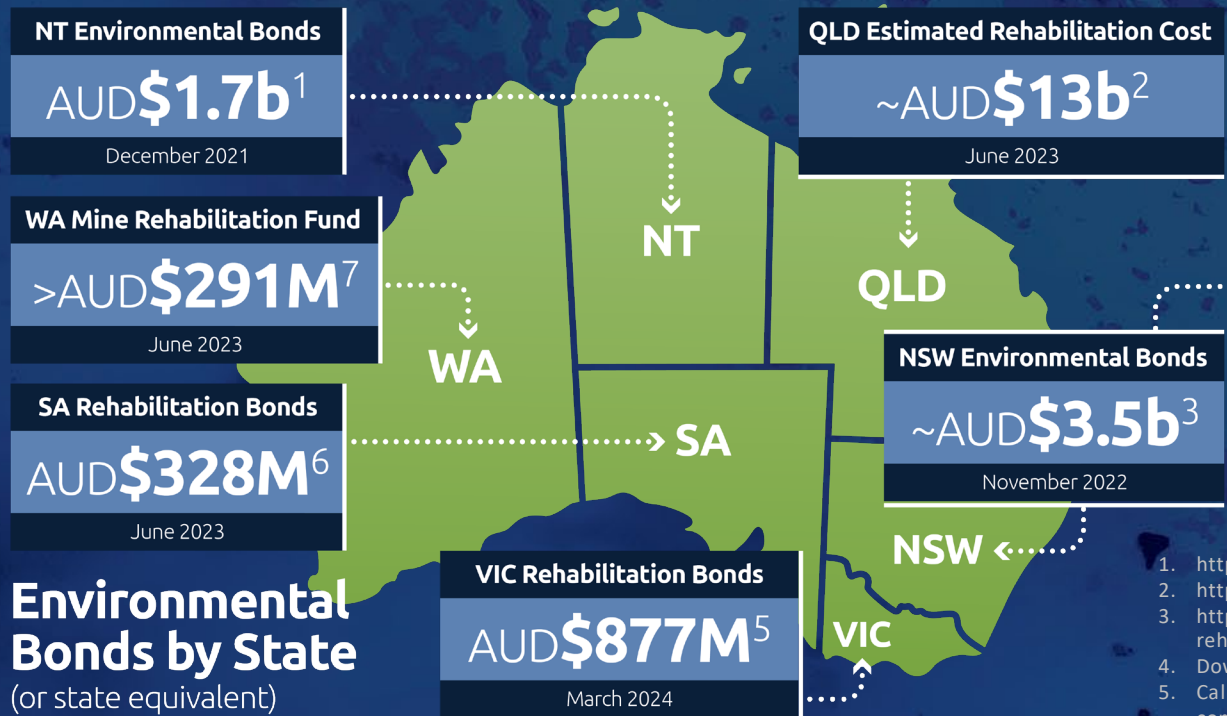
Pyrrhotite contains less sulphur than pyrite, and the rejected sulphur is captured as a gas and cooled to crystallise as elemental sulphur.

A second sulphur extraction step is achieved during leaching, during which the pyrrhotite molecules are oxidized to make hematite (Fe₂O₃). This process liberates sulphur, as well as any other metals (such as Co, Ni, Co, Ag and others) that may be contained in the pyrrhotite lattice.

By capturing the sulphur at each stage, any additional waste therefore has a much lower ability to form sulphuric acid; the main culprit in acid mine drainage.



Environmental and commercial gains



Environmental Bonds by State
(or state equivalent)

What is an environmental bond?

An environmental bond is a deposit to a government to cover potential damage from mining activities. Bonds vary by location and by project size and pollution risk.

Re-mining can reduce bond costs by lowering project size and risk, freeing up funds for rehabilitation and commercialisation of mine waste.

NSW Environmental Bonds

Using the NSW Rehabilitation Cost Estimation Tool⁴, Re-mining tailings to remove sulphides could reduce an environmental bond from >AUD\$800k/ha to AUD\$82k/ha (excl. water management & waste water treatment costs)

- <https://nt.gov.au/industry/mining/decisions/securities-held>
- <https://s3.treasury.qld.gov.au/files/Financial-Provisioning-Scheme-2022-23-Annual-Report.pdf>
- <https://www.resourcesregulator.nsw.gov.au/sites/default/files/2022-11/fact-sheet-exploration-and-mining-rehabilitation.pdf>
- Downloaded from <https://www.resourcesregulator.nsw.gov.au/rehabilitation/rehabilitation-security-deposits>
- Calculated from the Register of Rehabilitation Bonds <https://resources.vic.gov.au/community-and-land-use/rehabilitation>
- <https://www.energymining.sa.gov.au/industry/minerals-and-mining/mining/regulating-mining-activity/Mineral-resources-regulation-report/mine-rehabilitation-and-closure>
- <https://www.dmp.wa.gov.au/Documents/Petroleum/MRF22-23-Yearly-Report.pdf>



Case Study: Flin Flon tailings project

Site: Flin Flon TSF

Location: Manitoba, Canada

Commodities: Zn-Cu-Ag

Status: initial testwork completed.
Confirms >90% conversion of pyrite to pyrrhotite from tailings sample, with capture/removal of elemental sulphur



Estimated >100 million tonnes¹ contained in tailings dam at Flin Flon. Tailings contains Zn, Cu, Ag and Au.

HUDBAY

Cobalt Blue and Hudbay Minerals collaborating to apply Cobalt Blue's processing technology to the Flin Flon tailings facility, Manitoba.

Testwork results to date have achieved >90% conversion of pyrite to pyrrhotite + sulphur.

An overall flowsheet is now being designed for the final step of testwork.

1. https://s23.q4cdn.com/405985100/files/doc_news/2022/HBMNR21_ExplorationUpdate_FINAL.pdf



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