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Project Summary

Data Integration, Forecasting and Scale

Project 4.9
Mine pit lake assessments and management: A National Initiative to support mine closure and regional opportunities

Why the project?

Pit lakes are formed when water fills a void created by mining activity. The size of pit lakes varies considerably. Some are shallow while others are kilometres wide and very deep. During operations, surface and ground water is pumped out; however, after mining ends and pumping ceases, the void naturally fills with water slowly via groundwater, or more rapidly from rivers, creeks and rainfall.

This brings opportunities and challenges. Pit lakes could provide a valuable water resource for regional communities, with economic, social and cultural value. On the other hand, pit lakes pose environmental, safety and other risks that require careful management. Currently, various regulatory, technical and other hurdles limit the likelihood of further use.

Over four years, the project aims to:

- produce national guidance to inform mine development and closure planning, including a national pit lake classification framework and guidance on the level of assessment requirement for different mine risk profiles
- work with Traditional Owners and regional communities on information about risks and opportunities associated with pit lakes
- undertake closure and relinquishment case and field studies to define the residual risk of existing left-in-place pit lakes, opportunities for beneficial use and how stakeholder aspirations can align with what is technically possible.

What will the project deliver?

The transdisciplinary research team will:

- develop national screening guidance, incorporating scenario assessments to provide confidence in mine planning and evidence of pathways to closure and post-mine beneficial use
- develop strategies, toolkits and processes to improve communication across organisational teams to inform decision-making about pit lakes
- develop an approach for understanding the aspirations of First Nations people and regional communities about pit lakes, including for use of water
- make recommendations on the suitability of technical models and their complexity and data requirements for assessment of different mine pit environments
- trial processes to better understand hopes and values of First Nations and regional communities and regulators for future pit lakes. Two study regions have been selected for this work - the Pilbara and the Bowen Basin in Queensland
- create common language tools around opportunities and risks associated with pit lakes
- explore ‘pit lake risk’ with different communities - What does this mean for them
- develop a screening tool for identifying different risk profiles and potential beneficial uses
- train and support students and professionals on mine site planning and closure
- develop a website and other audio-visual material that provides resources, relinquishment case studies and education materials on pit lake closure options.

Who are the end users?

The guidance, tools and resources will be useful for the mining and mining equipment, technology and services sector as well as regulators. Communications materials will be particularly useful for First Nations and regional communities.

How can I engage?

The project team is keen to hear from those interested in the project, particularly First Nations and regional communities. There may be opportunities to be involved in different aspects of the project, particularly development of common language tools, case studies and education materials.

Timeline

2023 - 2027

How does this align with CRC TiME Impact objectives?

- **Mines are closed in ways that deliver social, economic and environmental value**
- **Closed sites are repurposed to enable a faster transition to diverse and resilient local economies**
- **Mine closure business solutions drive new commercial and/or regional closure opportunities**
- **Continued investment in Australian resources**
- **Policy, decisions and management systems reduce risks**

Project Partners

Project Participants

ChemCentre, CSIRO, Curtin University, Flinders University, The University of Queensland, The University of Western Australia, BHP, Rio Tinto, Minerals Institute of Western Australia, South32, EnergyAustralia Yallourn, GHD, Iluka Resources

Advisory Participants

WA Department of Water and Environmental Regulation, Eco Logical Australia, Aurecon Australiasia, Department for Energy and Mining (SA), FMG, Department of Mines, Industry Regulation and Safety (WA), Isaac Regional Council, Central Highlands Development Corporation, Pilbara Development Commission, The Office of the Queensland Mine Rehabilitation Commissioner, Premier Coal, Mine Land Rehabilitation Authority

Australian Government
Department of Industry, Science and Resources
AusIndustry
Cooperative Research Centres Program