Geotechnical assessment for the waste rock backfilling of the decommissioned Rum Jungle Open Cut Pit.

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Since 2009, the Northern Territory and Australian governments have been working under a national partnership arrangement to complete investigative works to inform a rehabilitation plan for the former Rum Jungle uranium mine. The results of these programs have been used to develop an improved rehabilitation strategy that is consistent with the views and interests of stakeholders and meets contemporary environmental and mined-land rehabilitation standards.

Part of the rehabilitation strategy is to backfill a flooded former pit, which extends up to 100m below the current pit lake, and is partly backfilled with existing uranium tailings. It is proposed to utilise the remaining void to store Potentially Acid Forming (PAF-I) waste rock currently stored in large stockpiles across the site. The objectives of the backfilling are to:

- Isolate tailings currently stored at depth;
- Submerge and lime-amend waste rock to reduce Acid Mine Drainage (AMD) production;
- Provide a geotechnically stable landform;
- Provide a water cover under which the stored tailings and waste rock may settle and stabilise;
- Allow for geotechnically and geochemically safe conveyance of restored river flows; and
- Create a physical structure capable of supporting aquatic and ecological flora and fauna.

This paper provides insight into the detailed assessment and characterisation of the decommissioned Pit including how backfill design was developed using data sets spanning more than 50 years, including intrusive investigation data and historic archived photographs. Assessment characterised the main geotechnical constraints using a combination of rock mechanics, soft soils analysis and slope stability analyses to inform the backfilling strategy. The paper details how outcomes from the assessment were used to develop the backfill detailed design and remediation plan which included subaqueous placement, borrow pits, materials handling infrastructure and monitoring strategies.