Corporación Instituto de Tecnologías Limpias (ITL)
Antofagasta
Carrera #1615

CHALLENGE TITLE

Tailings Production with Lower Water Content and Improved Deposition.

CHALLENGE DESCRIPTION

Tailings management is one of the main environmental and operational challenges in mining. Conventional tailings contain high levels of water, which complicates safe deposition, increases geotechnical risks, and limits water recovery for recirculation. This challenge seeks to promote solutions that enable the generation of tailings with lower water content, facilitating safe, stable, and environmentally responsible deposition. Technologies for filtration, chemical stabilization, and regulatory strategies that enable new tailings management practices will be valued, aiming to reduce risks and improve water efficiency in the process.

GENERAL OBJECTIVE

Contribute to the development of technologies and strategies that enable the generation of tailings with lower water content and improved deposition, enhancing operational safety, water efficiency, and environmental sustainability.

SPECIFIC OBJECTIVES

1. Scale filtration and dewatering technologies to reduce water content in tailings.
2. Develop chemical stabilization solutions to improve consistency and geotechnical stability of deposited tailings.
3. Design and validate regulatory and operational strategies for the safe implementation of low-moisture tailings.
4. Conduct pilot tests under semi-industrial conditions to measure technical, environmental, and safety performance.

EXPECTED RESULTS

- Technical reports with validation results at semi-industrial scale.
- Significant reduction in tailings moisture and improved deposition stability.
- Technical and regulatory guideline document for industrial adoption.
- Strategy and technical evidence to support new Chilean regulations on tailings with low water content.

SCOPE

Includes:

- Technologies with TRL $\geqslant$ 4 applicable to moisture reduction in tailings.
- Demonstrations in controlled relevant environments, semi-industrial and operational piloting and validation.
- Evaluation of technical, environmental, water efficiency, and safety performance.
- Studies on integration with tailings management and environmental management systems.

Does not include:

- Proof-of-concept and/or laboratory-scale tests with TRL < 4.
- Solutions that pose additional risks to worker, equipment, or environmental safety.
- Technologies that increase consumption of strategic resources such as water or energy.
- Interventions that negatively interfere with the continuity of the production process.

KEY PERFORMANCE INDICATORS (KPIs)

5. Water recovery for recirculation (%).

6. Improvement in geotechnical stability of the deposit (safety factor, settlement, shear strength).
7. Granulometric separation efficiency (% of coarse fraction recovered).

DESIRABLE CONTRIBUTION TO ITL CAPACITY BUILDING

- Development of capabilities in geotechnical modeling, water efficiency, and environmental management of tailings.
- Generation of validation and technological certification protocols for low-moisture tailings management.
- Infrastructure for pilot testing of tailings filtration and stabilization technologies.