

A photograph of an industrial dewatering facility at dusk. The scene features a complex network of blue steel structures, yellow pipes, and machinery. The facility is situated on a body of water, and the sky is a mix of orange and blue. The lights of the facility are reflected in the water.

Recent Developments in Dewatering Technologies for Tailings Disposal

Laurie Barlow

Wet tailings

Main challenges

TRIPLE THREAT



DECLINING ORE GRADES MEAN MORE WATER FOR PROCESSING AND LARGER TAILINGS DAMS TO MANAGE

1. WATER USE



HIGH WATER USAGE IN AREAS OF INCREASING SCARCITY & WATER MANAGEMENT CHALLENGES IN WET CLIMATES

2. DAM FAILURES



TAILINGS DAM FAILURES CAN BE CAUSED BY ONE OF A VARIETY OF FACTORS, MANY UNPREDICTABLE

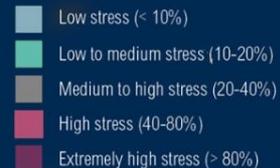
3. ENVIRONMENT



POLLUTION AND CONTAMINATION OF GROUND WATER & RECLAMATION OF TAILINGS AND WASTE AREAS AT CLOSURE

WATER STRESS BY COUNTRY

ratio of withdrawals to supply



This map shows the average exposure of water users in each country to water stress, the ratio of total withdrawals to total renewable supply in a given area. A higher percentage means more water users are competing for limited supplies. Source: WRI Aqueduct, Gassert et al. 2013

Average size concentrator with a capacity 100,000 tpd and a Water Ratio of 0.5-0.7 (Cyclone – High Rate Thickener) requires 50-70,000 m³ (50–70 million liter) of water per day



As water scarcity deepens, political instability grows (The Guardian-March 2017):

In Bolivia, Peru and Ecuador disputes over water shortages are part of a wider fight for equal access and shared responsibility. The world population is 7.6 billion and growing which will increase competition for scarce resources.





The mining industry needs to:

- Minimize water usage during processing
- Maximise water recycling

Tailings solutions



What are the best options to handle tailings?

The amount of water in the tailings increases for each solution listed.

The best solution to eliminate risk and to reduce the consequence of a failure is to **“remove the water”**.

Filtered tailings are the lowest risk and consequence.

The cost of the solution is also relative to the amount water in the tailings: Lower water means more cost.

1. **Filtered tailings**
2. **Eco Tails**
3. **Paste thickener underflow**
4. **Thickener underflow**
5. **Cycloned sand dam - discharge of tailings without thickening**



Filtered tailings

Benefits of filtered tailings

- Eliminates need for slurry tailings dams
- Reduced risk
- Lower fresh water use
- Cost competitive: feasible for large scale operations - economically competitive with desalination, even for high tonnages



Vacuum Filters



Belt Press



Centrifuge



Pressure Filters

Filtered tailings – Karara

Reference project

Dry tailings handling

Client:	KML
Location:	Australia
Equipment:	330 m mobile stacking conveyor
Capacity:	2850 mtph
Belt:	55 inch, 3 m/s
Material:	Iron ore tailings
Filters:	Pressure Filters



The EcoTails[®] solution



EcoTails

COOPERATION WITHIN
THE INDUSTRY



Co-mingling

STRONG, STABLE TAILINGS. NO
SEEPAGE, SAFE IN SEISMIC ZONES



90% reuse

STUDIES AND TEST RESULTS INDICATES
90% RECOVERY OF PROCESS WATER



Sustainable

REDUCES THE
FOOTPRINT OF THE MINE

EcoTails® and Filtered Tailings

- **Purpose Built**

Each system optimized to specific project conditions and criteria. Combines crushing, filtration and materials handling technology.

Thickener



Pumps



Filter Press



HAB Feeder



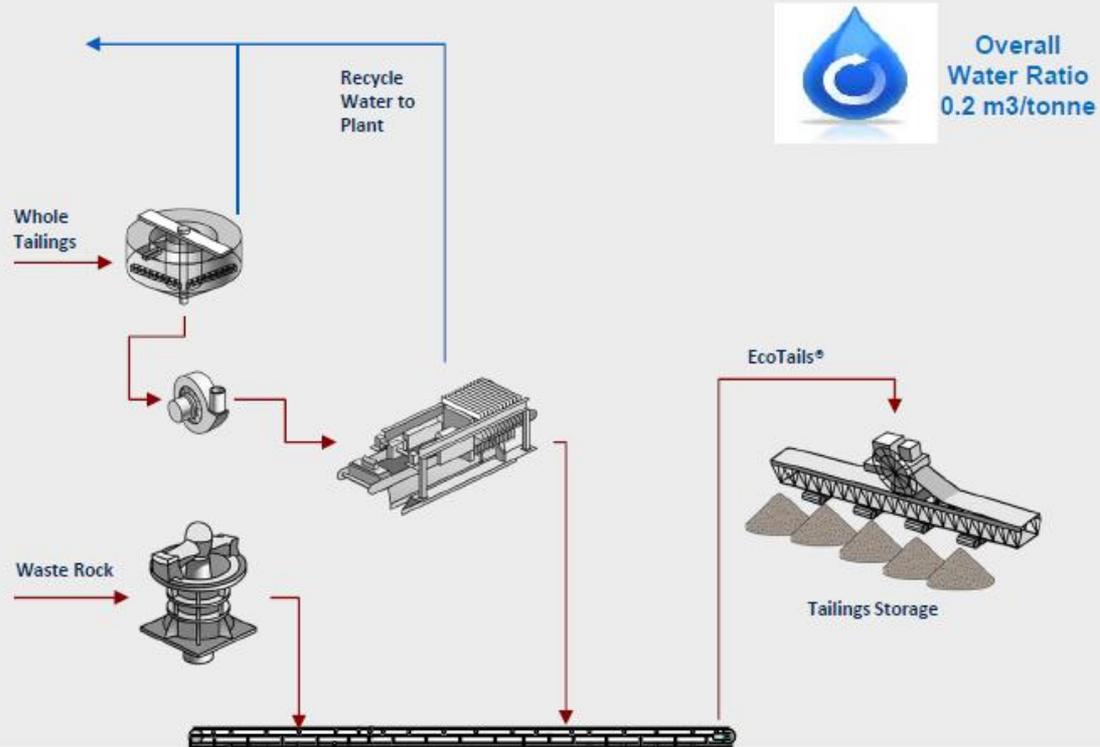
Conveyors



Stacking System



EcoTails® Tailings Flowsheet

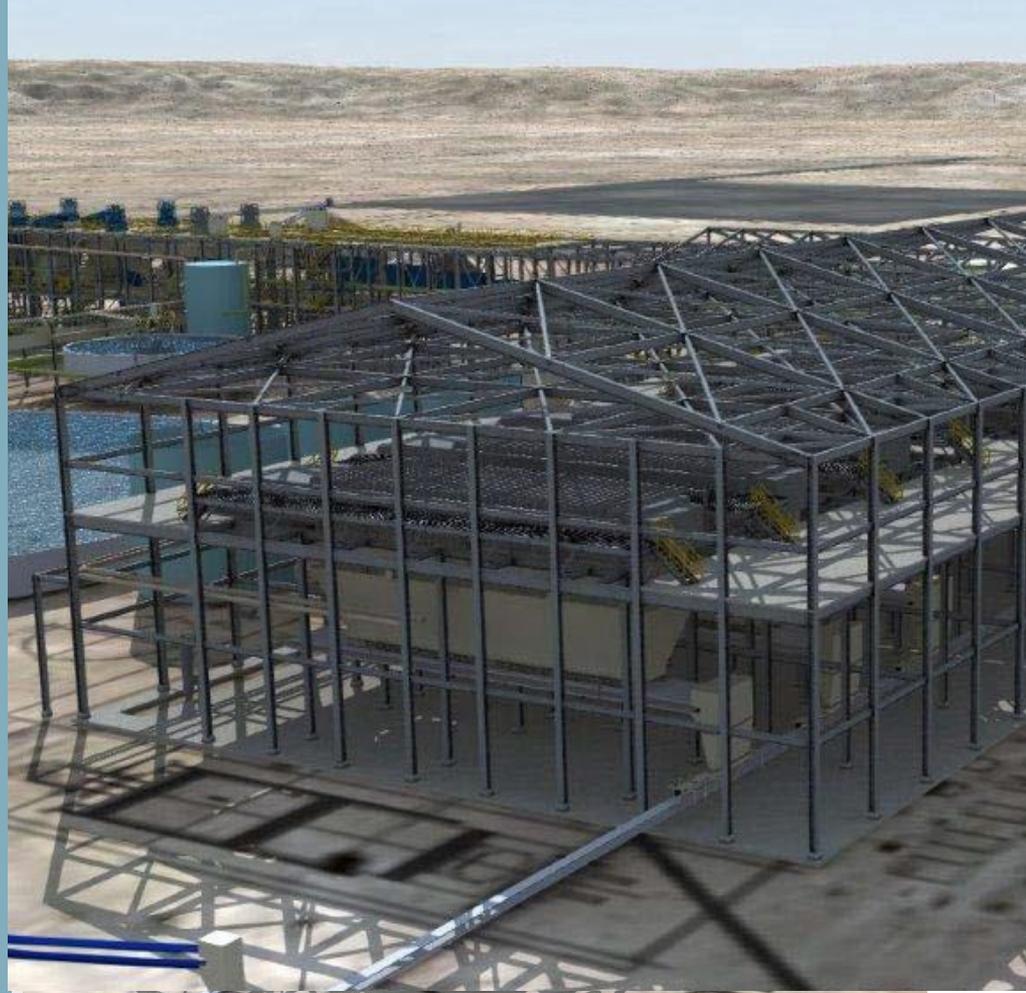


Making Dry Tailings Viable



To make it economically viable for large mining operations to use dry stacked tailings and EcoTails, we developed the EcoTails 5x3 Filter Press.

- Less filters
- Reduced pumps, valves
- Less conveyors, feeders
- Simpler control
- Small footprint





Capacity per plate
increased ~4x



Reduced filter pack length, reducing
filter press footprint



Ability to feed 160 plates
(100% increase)

	Capacity per plate increased ~4x	Reduced filter pack length, reducing filter press footprint	Ability to feed 160 plates (100% increase)
Traditional Plate & Frame Issue	<ul style="list-style-type: none">• Plate Size – common industry standard 2m x 2m	<ul style="list-style-type: none">• Plate thickness – standard polypropylene lightweight but low strength, requiring thick plate	<ul style="list-style-type: none">• Plate quantity limitations – filter typically limited to 80-100 plates due to dynamics of single ended feed
EcoTails® Filter Innovation	<ul style="list-style-type: none">• 3m x 5m plate, which will be the largest commercial plate of its kind	<ul style="list-style-type: none">• High strength composite material used for plate construction, allowing thinner plate design	<ul style="list-style-type: none">• Filter fed from both ends to allow feed to greater number of plates per unit



Dewatering time reduced by 50%
and eliminated need for air blow



Open / close travel time twice as
fast as nearest competitor



Improved filter
cake consistency

**Traditional
Plate &
Frame Issue**

- Slow low pressure multi-stage dewatering process required to achieve target moisture of stackable tailings – pumping and air blow

- Slow filter opening and/or inefficient closing time – slow hydraulic rams, and inefficient single plate opening process

- Uneven dewatering in filter chamber caused by feed location in upper portion of chamber

**EcoTails®
Filter
Innovation**

- Tailings product is conveyable; additionally, blending of tailings and waste rock allows for relaxation of moisture target
- High pressure (10-15 bar) pumping allows for rapid dewatering in a single step

- Rapid hydraulic wheeled drives and efficient opening of whole plate pack

- Filter chamber feed location optimized for even distribution
- Multi port feed chamber optimized

Eco Tails 5x3 Filter Press technology



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