

# **Water saving strategies and initiatives for Metallurgical Process Plants**

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- Strategies for water saving at Tailings Dams
- Strategies for Met Plants
  - Best Management guidelines
  - Water and Salt Balances
  - Stormwater Control

## Why is it important?

- Environmental
- Economics
- Closure

- Too much
- Too Little
- Too Dirty



**Water management on TSF's**



**Water management on TSF's**



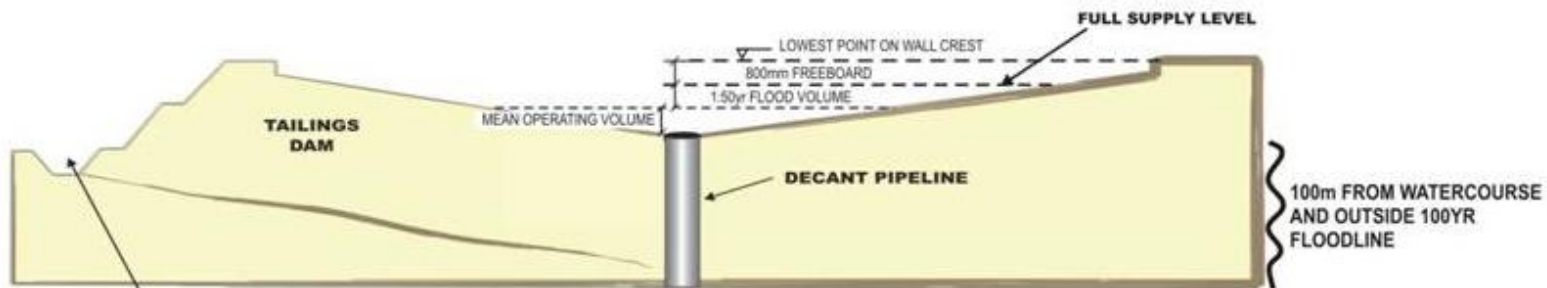
**Water management on TSF's**

# MINE WATER MANAGEMENT

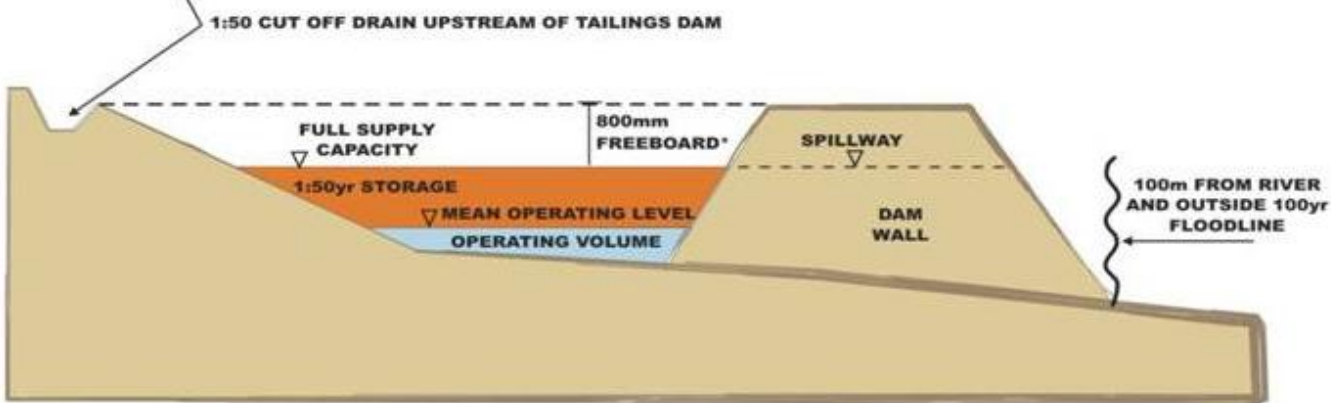


# Water saving strategies for Tailings Dams

**REGULATION 704 OF THE WATER ACT (ACT 36 OF 1998)  
DIRTY WATER CONTAINMENT AND FREEBOARD REQUIREMENTS**



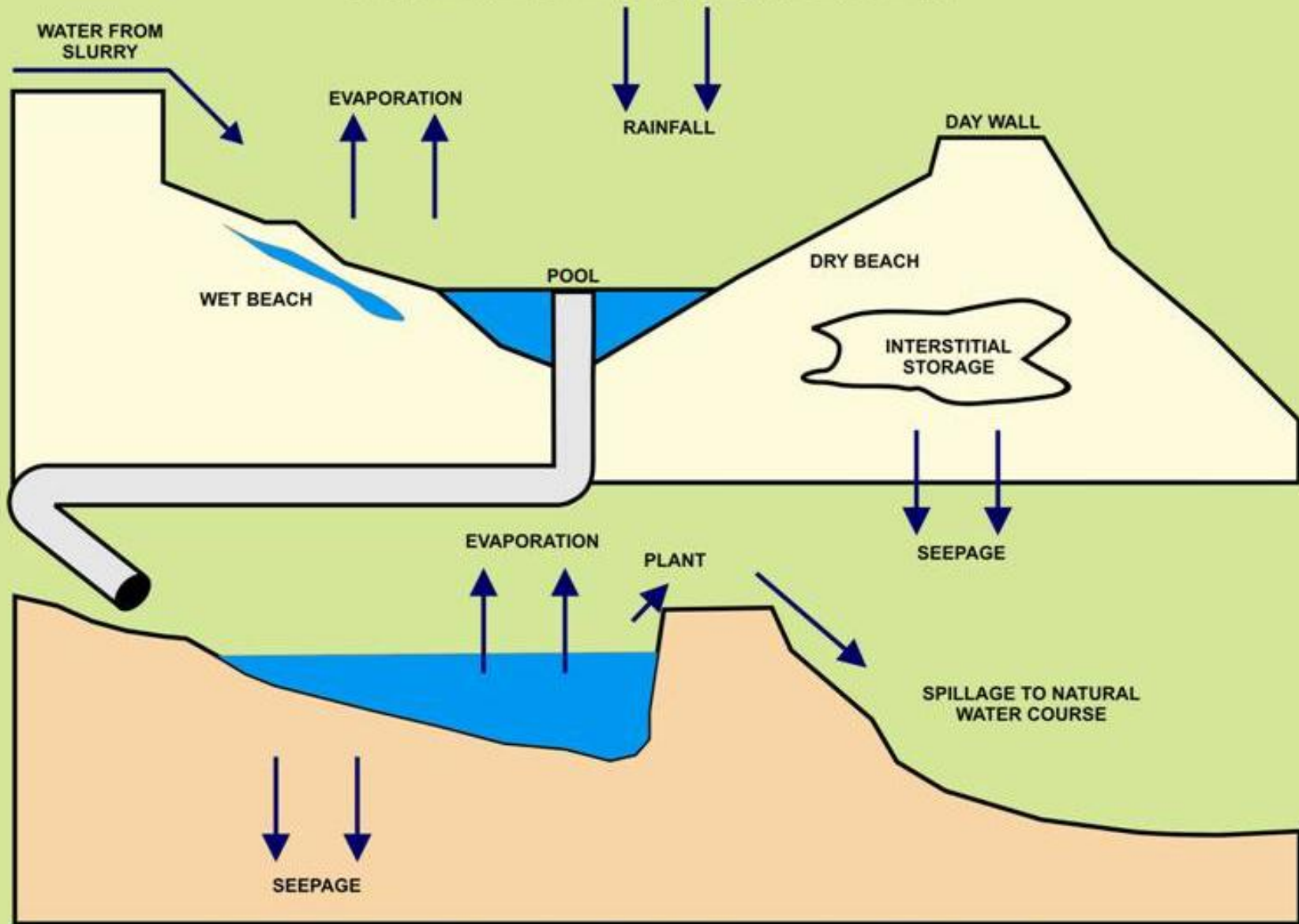
**TAILINGS DAM REQUIREMENTS**



**RETURN WATER DAM REQUIREMENTS**

\* APPROVED PROFESSIONAL PERSON WILL REQUIRE MORE STRINGENT VALUES FOR SAFETY REASONS.  
IT IS LIKELY THAT AT LEAST 2m OF FREEBOARD FOR TAILINGS DAMS WILL BE REQUIRED

# MINE WATER MANAGEMENT



Schematic outlay of water balance for tailings dams

- Increase slurry density to within pumping limits
- Design Tailings Facility in accordance with regulation R704
- Manage and optimise deposition cycle
- Maintain small pool (reduced evaporation) Dust issues?
- Operate Return water Facility in Accordance with the design Requirements
- Monitoring
  - Measure flow from penstock and solution trenches
  - Measure plant usage
  - Maintain a real time water balance



## Water management on TSF's



**Water management on TSF's**

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- **Thickened Tailings advantages**
  - Reduced water reticulation
  - Reduced or no pool on top of TSF
  - Reduced potential for infiltration and reduced seepage generation
  - Minimised/reduced dust emissions
  - Potential for co-disposal of tailings and waste rock

# Water saving strategies for Met Plants

- What has the mining fraternity done in the last 20 years
  - Extensive Stormwater control
  - Treatment of water
  - Trying to understand where the water goes
  - Understanding what qualities of water can be used where (sewage, UG water, Stormwater)
  - Water shortages an issue to sustain the mine as the mine in the hierarchy has dropped
  - Environment and pollution are worldwide issues



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## **Step 1: Pollution Prevention**



## **Step 2: Minimisation of Impacts**

Water reuse and reclamation

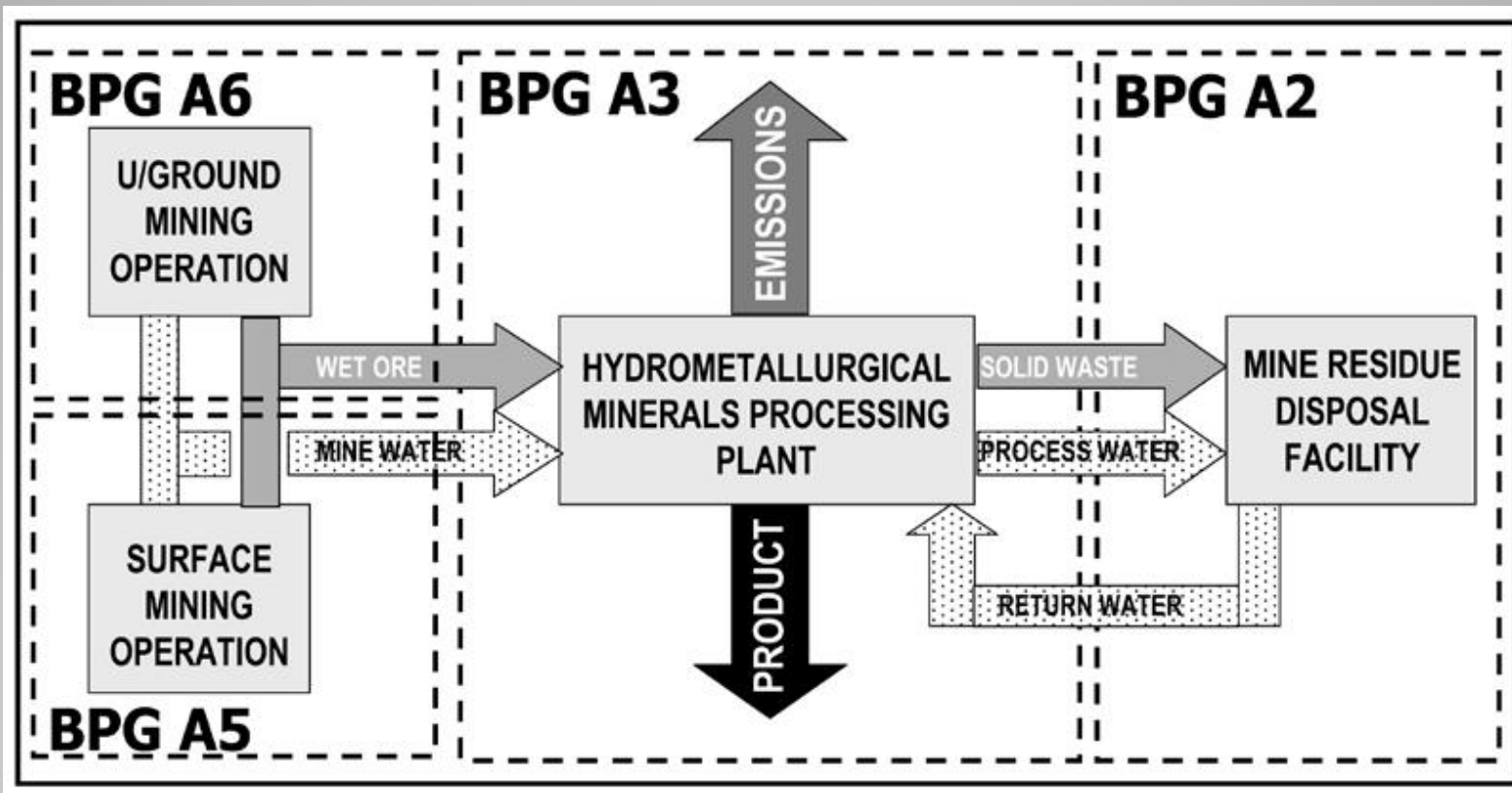
Water treatment



## **Step 3: Discharge or disposal of waste and/or waste water**

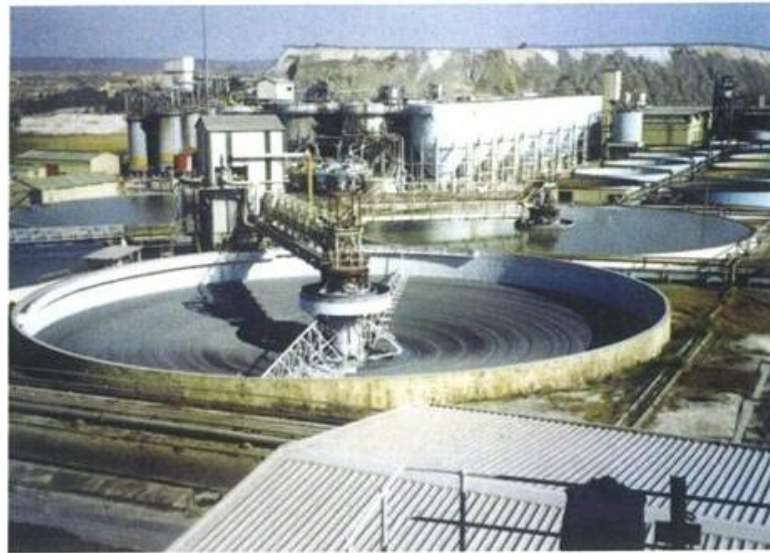
Site specific risk based approach

Polluter pays principle



## Water management on TSF's

Series A: Activity Guidelines



A3

BEST PRACTICE  
GUIDELINE

## Water Management in Hydrometallurgical Plants

*Best Practice Guidelines for Water Resource Protection in the South African Mining Industry*

DIRECTORATE: RESOURCE PROTECTION & WASTE



water & forestry

Department:  
Water Affairs and Forestry  
REPUBLIC OF SOUTH AFRICA

 **SRK Consulting**  
Engineers and Scientists

Water management

**Understand the true cost and value of water**

**Apply general “good” housekeeping and operating practices**

**Optimize pollution prevention and reduction at source**

**Optimize water management system**

**Undertake inspection\monitoring\ auditing and maintenance**

**Review resources intake\input\raw materials**

**Optimize reuse and reclamation (recycling and recovery)**

**Investigate process or technology modifications**

**Consider options for application of cleaner technology**

**Water and waste management programme**

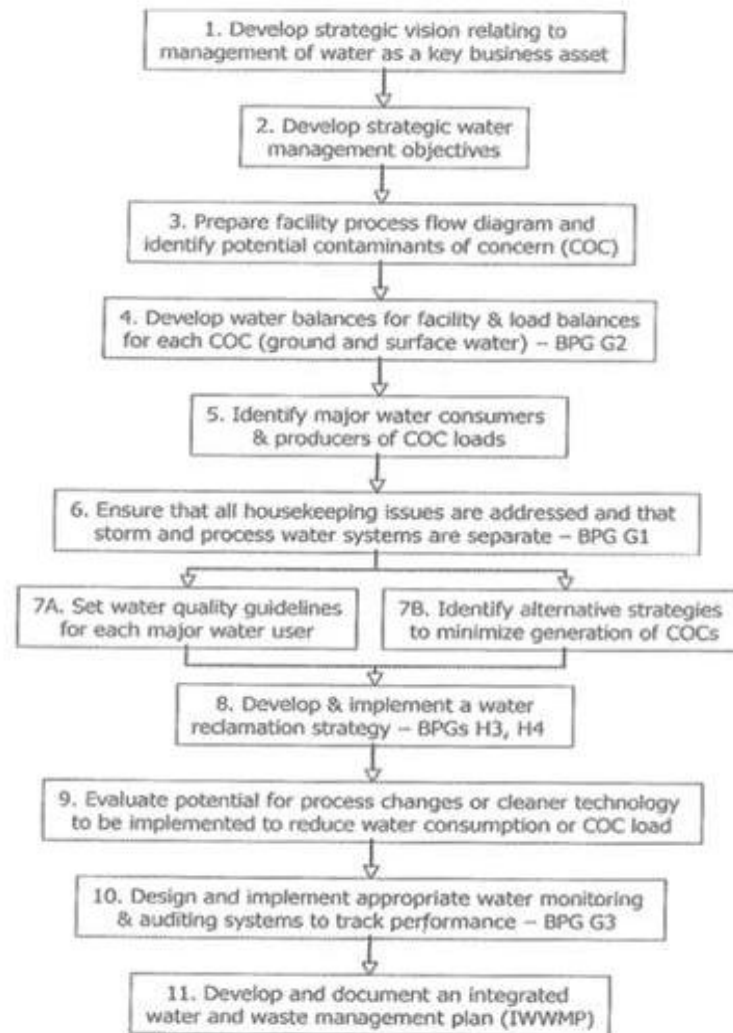
## Understand the true cost and value of water

The true cost and value of water includes all direct costs of water use on site as well as its value as a business asset required for continued operation, for example:

- Cost of exploration and extraction of groundwater;
- Social, cultural, environmental, and economic feasibility study costs;
- Waste stream disposal costs;
- Cost of water supply;
- Reticulation costs such as pumping, storage, power consumption;
- Water treatment costs;
- Mitigation and remediation costs in the event of spillage;
- Construction and rehabilitation costs of engineering works e.g. river diversions, clean/dirty water diversions etc;
- The value of ecosystem services reliant on the same water supply;
- Competing social and industry demands on the same resource;
- Competing industry demand for the same resource;
- Economic value to allow production and processing to take place; and
- Loss of income, jobs or market share if there are production cut-backs and interruptions as a result of water excess or shortage.

## **Apply general “good” housekeeping and operating practices**

- Avoid cross-contamination of materials and chemicals by keeping the work area clean and organized;
- Segregate waste streams (consider piping and storage facilities) based on their level of contamination.
- Install proper safeguards (bunded areas, diversion berms, concrete paving) and implement better cleanup practices (washing, sweeping etc);
- Consider general layout of the site and process plant as well as placement of facility;
- Know and have a good understanding of the plant and water circuits.



## Stepwise procedure for water management at a hydro- metallurgical processing plant

**Thank You**