

Water Use Efficiency on Minesites

Landloch Pty Ltd can apply the latest technology and knowledge to help minesites improve their water use efficiency. The most critical step in improving water use efficiency is to gain an accurate picture of water use on a site. Landloch has the ability to accurately measure pipe and open channel flow rates and evaporation and seepage losses from storages. Accurate data is vital when considering options to improve water management on site. Improvements in water use efficiency can enable mines to:

- optimise the minesite water balance;
- reduce losses and/or increase production;
- increase the security of water supplies;
- prolong the life of existing infrastructure;
- reduce the need to purchase additional water allocation; and
- reduce operational costs.

Water management is becoming increasingly demanding. More stringent legislation and increased competition for available water as more mines become operational or expand are limiting the volume of water available in many areas.

There is currently little information available for the Australian mining industry on best practice water use, or on methods for maximising water use efficiency. It is unlikely, therefore, that water is currently being used as efficiently as it could be. It is impossible to manage water resources effectively if they are not measured and monitored.



Many mining operations are becoming increasingly concerned about the security of their water resources. Purchasing additional water is often impossible as few catchments have spare water available. Optimising the efficiency of current systems and reducing the losses in a minesite water balance can reduce the need for purchasing more allocation or investing in additional water infrastructure.

Water use efficiency gains can be made from all parts of the system, from the groundwater and pumping infrastructure, to the pipe networks and water storages. Gains can also be made from improved monitoring and management of the movement of water.

Before any system can be optimised, the performance of the current system **must** be benchmarked to assess which changes will have the greatest impact. Benchmarking is typically done by using a water balance, however actual values of the parameters within the water balance are often estimated instead of measured. While water flow in pipes is often metered and measured, the efficiency of water storages, pumping systems and distribution systems is often neglected. Losses via seepage, evaporation, leaks and worn equipment can add up to large volumes of water and unnecessary operating expenses.

Large reductions in water losses can be achieved from better design and management of water storages and supply systems. Often water storages are large and contain shallow depths of water. Deeper storages with smaller surface areas result in lower evaporation rates. Proper design, or a redesign of existing storages can greatly increase the amount of water available for minimal capital investment.



Evaporation and seepage losses from storages can be quite high. Evaporation rates of up to 3,000 mm/y (30 ML/y for every hectare of water open to the atmosphere) are common in many mining areas. Seepage losses from mine storages differ greatly, due mainly to the variable quality of construction and the materials used. Landloch has measured seepage rates in excess of 5,500 mm/y. Subsequent works on the leaking storage reduced this seepage loss to 1,500 mm/y. Seepage losses can be larger than evaporation losses.



Distribution systems (pumps and pipes) are designed to produce particular flow rates and pressures. Changes to operations such as increasing production or changes in processes can alter the water demand and can change the efficiency of distribution systems. Older distribution systems tend to leak. Leaks in agricultural irrigation systems have been measured and as much as 10% of the water being conveyed in these systems was lost in leaks. Leaks are often difficult to see, particularly in buried pipes.



Better management of water can also result in large savings. Management strategies may involve pumping from several shallow storages into fewer, deeper storages, reusing water of lower quality for purposes that do not require potable water, rather than treating all water to high standards, or performing maintenance on pipe infrastructure to limit blockages and detect leaks.

Landloch staff have extensive experience with water distribution systems and are able to collect accurate data used when optimising water balances. Landloch can supply equipment to minesites that enable accurate measurement of evaporation and seepage losses from storages and open channels, and leaks in pipe networks.

For more information on improving minesite water use efficiency, contact:

Evan Howard (B.Eng)
Environmental Consultant
howardev@landloch.com.au

Cam Vacher (B.Eng, Grad Cert Min Res)
Environmental Consultant
vacherc@landloch.com.au

Landloch Pty Ltd
PO Box 57
HARLAXTON QLD 4350
Ph: (07) 4613 1825
Fax: (07) 4613 1826
Email: admin@landloch.com.au
Web: www.landloch.com.au