

Reducing Dam Evaporation Losses

Background

Evaporation losses from Perth's storage dams can be quite significant during the summer period due to the extended periods of high temperatures and strong easterly winds.

The Integrated Water Supply System has 9 large storage dams in the Darling Range. Remedial measures to reduce evaporation could be costly and is always going to be challenging due to the large number of dams.



Over the 1994-2004 period, between October and April, net losses from the storage dams were in the order of 27 gigalitres per year. This is a significant amount of water lost (about 10% of annual Perth water use).

Typically there are two types of barriers to reduce evaporation from storage dams.

1. *Chemical barriers*

These barriers are essentially a thin chemical monolayer (typically hexadecanol or octadecanol) spread across the surface of the dam storage. The film or monolayer reduces evaporation to the atmosphere. Re-treatment with the monolayer is usually required every 2 to 4 days, depending upon the amount of turbulence on the water surface. The monolayer has no adverse impact on water quality. These barriers can reduce evaporation by about 10-40%.

The main constraint with using these in Perth is that the Water Corporation's storage dams are large and the surface waters are rough (due to the wind). The monolayer probably won't last very long in that environment and that would increase the frequency of renewal of the layer and therefore the costs.

2. *Floating barriers*

Examples include floating covers, floating domes or balls and shade cloth covers. These physical covers can reduce evaporation by up to 70%. They potentially could change the ecology of the dam water due to reduced sunlight penetration. The biggest issue with these is the practicality and high cost of construction and ongoing maintenance. These are more feasible for small dams and reservoirs than for large open storage dams.

Current Situation

The Water Corporation is not actively using any technology to reduce evaporation from its storage dams. This is consistent with what is happening around Australia in the other major water utilities. No technologies have proven to be viable at present.



The Future

The Cooperative Research Centre for Irrigation Futures is undertaking a comprehensive trial on the use of monolayers in New South Wales and Queensland on dams used predominantly for irrigation, but also for drinking water supply. The project is called Dam Evaporation Mitigation. The project has only just commenced.

The Water Corporation will monitor the outcomes in this project to see if the monolayers could be considered for use on Perth storage dams in the future.

Reductions in evaporation losses could realistically be in the order of 3 to 12 gigalitres per year.

More Information

- National Centre for Engineering in Agriculture (NCEA):
<http://www.ncea.org.au/>
- Cooperative research Centre for Irrigation Futures:
<http://www.irrigationfutures.org.au/projects.asp?ID=37>
- Water Corporation report (by GHD Pty Ltd)
Evaporation from Storages
Final Report
February 2006