Tanks Maintenance of safe Drinking water beyond the WTP

Matt LePoidevin & Kriston Nilsson
North East Water

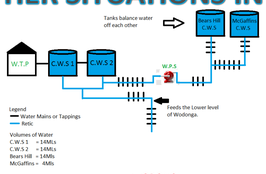
PROBLEM

•Cox Road storage tank was having higher than preferred plate counts and low chlorine residuals identified in the monitoring samples.

•One E Coli detection at Cox Road was identified in the past three years in the period with lower than required chlorine residual.

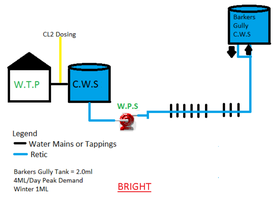
•Other **Possible** water aging issues can include:
- •Disinfection By-product formation
- •Microbial survival and growth
- •Corrosion (usually high pH with older water)
- •Discolouration
- •Decreased disinfection levels
- •Taste and odour

OTHER SITUATIONS IN N.E.W



WODONGA

- The WTP fills 2 main 14ml storages, a pumping station then fills 2 independent storages separated by a portion of reticulation system but hydraulically balanced.
- •Water age issues predominately relate to low chlorine residuals. This is countered by additional dosing of Hypo chlorite at the Beechworth pump station in the reticulation system and an supplementary dose into one storage tank to maintain effective residuals.



BRIGHT

•WTP is at the bottom of a valley, feeding directly through the reticulation system to the storage .
•This system continually returns older water to the storage whilst new water is used through the reticulation system.
•During summer periods the town uses two times the volume of the storage which maintains a good water age. Winter usage is dramatically less causing low chlorine residuals.
•To combat this an operational schedule was created to only pump during low use periods. Allowing fresh water to pass through the reticulation into the storage.

OPTIONS

CONSTRUCTION OF A NEW SYSTEM

Dedicated Supply Main

Using water quality as the driver in the risk assessments to allocate extra money to provide a dedicated water supply main.

Ring Main

If a dedicated main supplying the storage is not practical then using a ring main, non returns and separate entry and exit in the design could be cost effective.

Additional Disinfection Dosing.

Disinfection dosing to storages is practical, only masking the water age by maintaining chlorine residuals. This system will not turnover the stored water.

PRE-EXISTING STORAGES

Issues arise from the implementation of tighter drinking water quality requirements, change in usage over time due, or storages with extra capacity for the future. Pre-existing storages require operational changes or additional infrastructure to combat water age issues.

CONTINUOUS FLUSHING FROM THE STORAGE.

Flush regular quantities of water via a tap ensuring water is exchanged.

OPERATIONAL LEVELS.

The start, stop levels for pumps can be altered allowing increased volumes to be used before filling begins. Older water is drawn into the reticulation system and used before fresh water enters the storage.

FILL TIMES.

Restricting the operation of pumps ensuring the refills occur during periods of low use to maximise the new water moving through the reticulation into the storage.

VSD PRESSURE SYSTEM

Creating a variable speed drive pressure system and removal of the storage tank. This system reduces the volume stored and increases the ease of flushing older.

HYPO CHLORITE BOOST DOSE

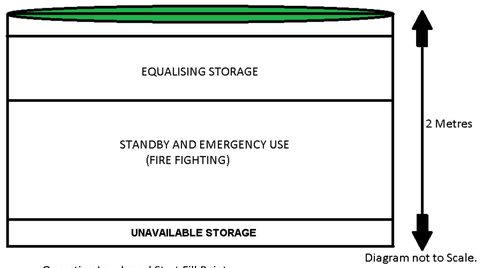
Include a dose point into the pumping station or directly to the tank. This process is used regularly in water storage tanks when low chlorine residual is an issue. The use of hypo chlorite dosing maintains the chlorine residual but only masks the water age.

PERIODIC FLUSHING HYDRANT

Periodic flushing via a hydrant in the reticulation. This moves new water into the reticulation but doesn't freshen the water in the storage.

TANK CLEANING PERIODIC

Increased periodic tank cleaning will ensure the surfaces of the storage are clean.



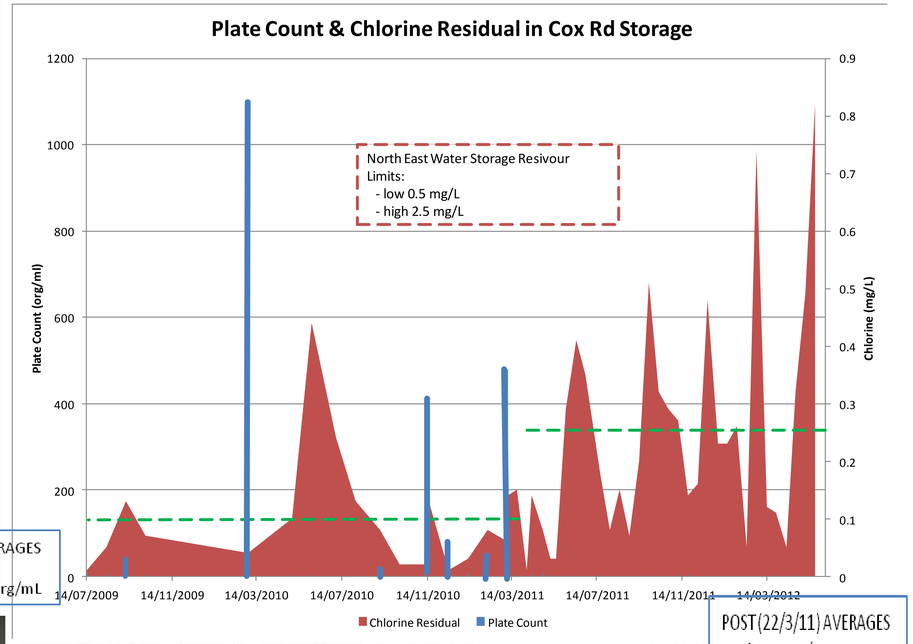
Operating Levels and Start Fill Points
Pump Start - 1.3m – Stop 1.6m (Equalising Storage)
Standby & Emergency Use 0.3m – 1.3m
Dead Storage 0 – 0.3m Below the inlet/outlet

OUTCOME

To maintain drinking water quality, currently we are:

- **Flushing directly from the tank when water quality issues arise.**
  Normal winter use turnover of full tank is 25 days with the tap open, 12 days
- **Flushing periodically from double acting main to freshen supply.**
- **Weekly testing of the water quality by North East Water**
- **Monthly testing from external laboratory**
- **Monthly tank inspections**
  Ensuring no pests causing e-coli or other issues Etc Frogs and Possums.

This maintenance strategy has allowed drinking water quality standards to be maintained as shown in the graph below. Increasing the average chlorine residual and reducing the plate count.



PRE (22/3/11) AVERAGES
- Cl 0.1mg/L
- P/Count 128.4 org/mL

POST (22/3/11) AVERAGES
- Cl 0.25mg/L
- P/Count 0.94 org/mL