CASE STUDY Midland Regional Hospital Portlaoise

Harvesting of RO unused water

Reverse Osmosis (RO) is used to produce ultra-pure water which has many uses in hospitals.

An RO unit forces incoming water through a membrane to produce ultra pure water. Much of the water does not go through the membrane and, along with salts, etc., is wasted to drain. This case study demonstrates how RO unused water can be captured for use elsewhere, and can meet drinking water standards.

The RO unit in the endoscopy department at Portlaoise Hospital supplies the steriliser with ultra-pure water. The team at Midlands Regional Hospitals and Green Healthcare wanted to find out how much water from the RO is unused and sent to drain, and the quality of that water (compared to drinking water).

HOW MUCH WATER IS BEING LOST

To find out how much water is sent to drain, water meters and data loggers were placed on the RO unit for 20 days to quantify:

A. The amount of water that is fed to the RO unit
B. The amount of ultra-pure water produced
C. The amount of water retained by the RO membrane and discharged to drain

Note:
72 sterilisation cycles took place over the 20 days analysed - an average of 3 to 4 cycles per day. This equates to an estimated 1300 cycles a year.

The RO self-cleaning cycle was also measured, and found to be very small (about 15 litres per RO cleaning cycle) compared to the water retained and wasted while producing the ultra-pure water.

Depending on the quality of mains water supplied, the percentages of ultra pure water used and unused water wasted to drain may vary.
THE QUALITY OF THE WATER LOST
Midlands Regional Hospital tested the unused water against drinking water standards. The results were as follows:

Laboratory analysis of the unused water shows it meets drinking water standards, i.e. is potable. This is perfectly good water that if used instead of sent to drain, could reduce water bills. The quality of the unused water will vary with location, depending on the incoming mains water. It should be noted that before mains water is even fed to an RO, it is usually softened and filtered, so it is even purer than mains water prior to entering the RO.

What these results mean
Currently the Midlands Regional hospital is looking at how best to use this water, but initial estimates suggest the following:

€2,400
Potential savings per year if unused water can be collected and used

€1,500–€2,500
Expected investment cost to use the water break tank and pump

8 -13 months
Payback

1300 m³/year
Volume of water that can be saved for the campus (7% of annual site water use)

What you can do
Every acute hospital will likely have scope for recovering and using retained water from RO units. Before considering reusing this water, check if your RO unit can have its performance improved with a high efficiency recovery unit. This will greatly reduce the volume wasted in the RO process.

If this is not an option, then the key steps involved should be:
• measure flows
• test the water quality (if needed)
• evaluate potential uses
• redesign infrastructure
• calculate payback

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