Green Nephrology

THE CAMPAIGN FOR GREENER HEALTHCARE

CONSERVING WATER IN HAEMODIALYSIS

http://www.greenerhealthcare.org/nephrology-resources/conserving-water

Producing the 120 litres of dialysate required for a typical four hour session requires around 400 litres of mains water! Reverse osmosis is an important step in the purification process that this water undergoes. Reverse osmosis systems vary in efficiency, but commonly reject up to two thirds of the water presented to them. Termed 'reject water', this high grade grey water does not come into contact with the patient at any stage and poses no infection risk, yet it is needlessly 'lost to drain' in almost all dialysis facilities. It could be used for so many other things…

CANTERBURY DIALYSIS UNIT

When the Canterbury dialysis unit updated its water purification system with the installation of a new reverse osmosis plant in 1997, it was soon apparent that large volumes of reject water were being 'lost to drain'. Within two years, and with the help of the hospital's Estates Department, a simple system capable of recycling 800 litres of this water per hour was installed at a cost of £15,000. The system has now been running for over ten years, saving the Trust £7,500 each year on mains water and sewerage costs.

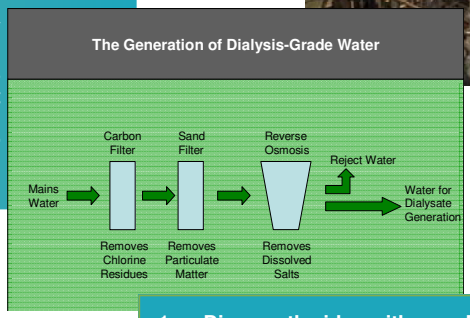
The salvaged reject water is directed to a recovery tank in the basement. From there it is pumped up to the grey water tank on the roof, which then supplies the water to the hospital toilets. Float switches divert reject water to the drain if the grey water tank becomes full, and diverter valves direct the reject water directly to the drain from the reverse osmosis system during monthly chemical disinfections.

ASHFORD DIALYSIS UNIT

A similar system was included in a new-build satellite dialysis unit in Ashford, where the conserved water feeds into the local laundry room. Because water recovery was designed in from the start, the costs were much lower: just £2500.

"Back in 1999 I was amazed how simple this all was to do – 10 years later, given the savings we've made, I'm amazed nobody else has done it too."

Steve Milne, Renal Technical Manager, Kent and Canterbury Hospital, UK.



BENEFITS OF WATER CONSERVATION

- Recycling reject water offers **considerable savings** on mains water costs, and also avoids the need to pay to put the reject water into the sewer.
- **Compliance with carbon targets** is of increasing importance, as impending regulatory and fiscal policies for carbon reduction will impact fundamentally on the cost and quality of healthcare provision. The NHS Carbon Reduction Strategy establishes NHS targets for reducing carbon emissions, and the Carbon Reduction Commitment will apply to individual Trusts from April 2010. Conserving reject water will help trusts to meet these targets.
- There are strong **environmental reasons** for saving water. Water is a finite natural resource. Climate change and population growth are leading to increasing water scarcity and many people now live in water-stressed areas. We all therefore have a responsibility to use water conservatively.
- This project allows Local Trusts to **demonstrate good corporate citizenship**, highlighting their decision to put social, economic and environmental considerations at the heart of their decision making.

HOW TO GUIDE GETTING STARTED

1. **Discuss the idea with your Renal Technician.**
2. **Involve your local Estates Department.**
3. **Clarify the scenario.**
4. **Clarify the potential volume of reject water that will be salvaged each year.**
5. **Assess the quality of the reject water to be salvaged.**
6. **Given the volume and quality of the reject water available, now identify the intended use for this water.**
7. **Calculate the financial cost per year of the current practice of supplying mains water for this intended use.**
8. **Calculate the financial savings resulting from the reduction in waste water from the haemodialysis unit.**
9. **Calculate the initial total financial expenditure incurred in implementing the methodology.**
10. **From these figures, develop a repayment projection and calculate the breakeven point.**
11. **Convince your Trust to fund the work.**
12. **System maintenance should become part of routine estates plant room inspections.**

FINANCIAL COSTS

The cost of incorporating the methodology into the design of the Ashford satellite unit was only £2500 (tank and control panel £1300; piping £1200). The piping was laid alongside other services required by the new build, so no cost was incurred for groundwork. The running costs of any pumps required must also be considered although, again, these are likely to be small. The cost of running the pump at the Ashford unit is less than £100 per year.

INVESTMENT APPRAISAL

The return on investment will depend upon:

1. The investment: the cost of installation & maintenance.
2. The return: the savings on mains water and waste water. This can be calculated by multiplying the regional mains water and waste water rates by the volume of reject water which the system is able to provide in place of mains water for an alternative use (e.g. laundry). It is useful to factor in projected price rises and changes in demand to gain a view of future potential savings.

In general, the return on investment is likely to be greater for a new-build unit, where the installation costs may be lower, and there is greater flexibility in arranging an appropriate alternative use for the salvaged water. This is borne out in our case studies:

	Unit					
		Canterbury (retrofit)		Ashford (built in)		
Year	Investment	Savings to date	ROI	Investment	Savings to date	ROI
1	£15,000	7500	50%	£2,500	£10,558	422%
2	0	15000	100%	0	£21,116	844%
5	0	37500	250%	0	£52,790	2112%
10	0	75000	500%	0	£105,580	4223%

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