

## Client testimonial for IWTM-UK

### Closed Loop Water Quality Issues Ulster Hospital

Despite being a relatively new building, we experienced water quality issues across our heating network. Routine monitoring found raised counts of soluble iron, conductivity and bacteria, which was exacerbated by significant breaches to the system. Chemical dosing, including shock dosing, was used to reduce the bacteria count and eliminate the oxygen in the system, but successes were only temporary.

The estates team encountered regular breakdowns including 4-5 control valves failing on a weekly basis costing the trust an estimated £200 per unit plus fitting. Based on our lab analysis and a BSRIA report it pointed towards the build-up of deposits caused by poor system water. These red-light indicators signalled the increasing likelihood of failure of a larger scale to the critical infrastructure of the Hospital.

### Identifying the Issues

There was also a significant rise in failures of the rubber based anti-vibration bellows, causing breeches to the system at a cost of £100 per unit plus retrofitting. This had a knock on effect of diluting the chemical dose within the heating system and further costs to re-dose and test.

Controls had been set up to facilitate an anti-stagnation routine via the BMS system, opening all valves to allow the water to flow through the system at regular intervals to prevent bacterial growth.

However, the effectiveness of this and whether it was working correctly was difficult at this stage to prove.

Ideally we would also want to investigate the commissioning results earlier to ensure proper delivery.

It would have been good to have better eyes on the commissioning earlier to ensure this was not part of the issue.

### **What we did next**

We continued with chemical dosing to keep the system as close to compliant levels as possible while proposals for chemical flushing of the system were discussed as a solution.

The chemical flushing solution would have required two operatives onsite for a minimum of seven months to backflush the system at a significant cost, estimated to be £280,000 and with no guarantee of success and huge disruption to systems and services in the hospital. With COVID restrictions hindering access to many clinical locations it was imperative a treatment was needed that didn't interfere with clinical services.

With spiralling costs and no improvement in the chemical levels and on the recommendation of our mechanical consultant we investigated chemical-free options.

After much consideration and investigation, the decision was made to proceed with the installation of Protector and Profill units across the most problematic networks.

### **Alternative Solution**

IWTMs Profill unit filters fill water through a resin bed which demineralises the water the result is alkaline water that is low in salts and has a minimum oxygen concentration.

Protector solution involved a systematic and progressive clean of the existing fill water. The process uses sacrificial anodes, in the form of Magnesium rods to extract oxygen, acid and aggressive salts from the water via dispersion through the system, creating an environment in which corrosion does not occur and bacteria will not survive. The magnesium hydroxide produced in this process helps to raise the pH value to an ideal range and depending on the

make-up of the water in the system, its conductivity then drops reducing the water hardness.

### Achievements

Heating system water quality has improved significantly. Corrosion is the single biggest cause of component failure with significant cost associated with their replacement. We experienced weekly breakdowns attributable to corrosion which diverted resource away from urgent or efficiency related tasks. Time spent on preventable maintenance is now avoided and the 10-12 days per month spent on this are now better directed.

Reduction in operating costs - the chemicals and testing alone for our water treatment cost was £60,000 per year these have been reduced to £2,500 per year. Payback period - the solution offered a return on Capital Expenditure at 10 months with an Operating Expenditure that was less than 3.5% of the current chemical-based treatment.

We reduced our environmental impact by no longer using in excess of 2,500Ltrs of chemicals each year and standard procedure for a chemical flush of an existing system requires many multiples of the system water volume whereas Protector is designed to treat the water in situ with none sent to drain. Therefor given the volume of the hospital's networks a chemical treatment would have sent 1.3 million of water to drain or nearly 2 million litres if a biocide wash was required whereas the Protector sends none to drain.

We reduced the risk to our Estates personnel as they no longer have to work with chemically treated water. Removing chemicals means they don't have to store or handle hazardous goods. This has made the plant room a safer and healthier working environment for our team whilst reducing waste liability and management administration.

With no water to drain we could reduce our licence fees.

Furthermore, control has been brought in house with the estates team trained to deliver the required PPMs. This includes sampling for water analysis meaning we no longer require a third-party water treatment company.

All operations were able to take place within the plant rooms which therefor had zero impact at ward level and no impact to patient wellbeing.

## Challenges

Buy in – This was twofold – Initially getting management on board to try new technology and understanding new treatment technology and getting to grips with the science behind it.

Secondly getting the Estates staff invested in the training involved and having them take ownership of the equipment and carry out servicing correctly.

There was no final date for results which was a challenge because we had to trust the process and have faith in the system we purchased as all systems are unique and it is impossible to put a time on the process.

Protector and Profill units are a treatment not a magic wand. The process is ongoing and once system water has been successfully treated and cleaned the units stay connected to keep the status quo.

Seed of doubt cast from various quarters mostly due to not understanding or having used the Protector and Profill systems before.

## Summary

- **Cost saving**

Payback was achieved within 10 months  
96.5% savings on operating expenditure  
Immediately cost positive Vs Flush £280k

- **Zero impact wardside**

All operations were able to take place within the plant rooms, which therefor had zero impact at ward level and no impact to clinical staff and patient care.

- **Reduction of chemical use**

No transport of harmful chemicals through our community. Broke the cycle of using chemicals (no more environmental damage from leaks). No chemicals, no COSHH means a Healthier, safer working environment for everyone and helps towards the Trusts sustainability targets.

Michael Armstrong



*Estates Operations Manager*

*Estate Services Department*

*Lagan Valley Hospital*