

# Advanced Pressure Management

## South East Water has successfully reduced average pressure by 17.7% and is saving 4.9 million litres of water per day

South East Water (SEW) supplies drinking water to over two million customers in Kent, Sussex, Surrey, Hampshire and Berkshire. The supply area covers some 5,657 square kilometres, with over 14,500 kilometres of water mains. In early 2012, the UK was facing critical drought conditions and the possibility of a third dry winter. In the southeast of England, water resource shortages were a very real threat. In April 2012 South East Water, together with a number of other water companies, issued a Temporary Use Ban that restricted customers' water use to ensure water supplies were secured for the essential uses such as drinking, washing and cleaning.



Lee Dance, Head of Water Resources and Environmental, South East Water pictured at Ardingly Impounding Reservoir in Sussex in December 2012, which should have been under several metres of water - Courtesy of South East Water

### The challenge

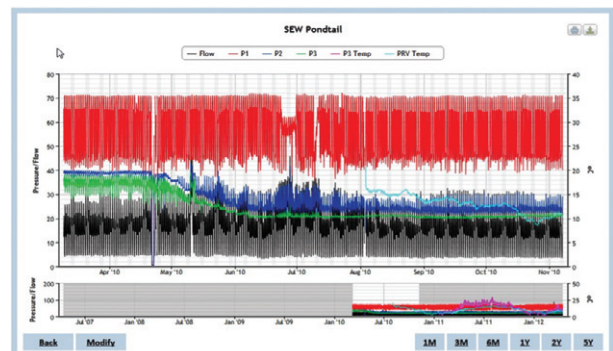
South East Water was aware that if they were asking customers to save water, they too should be doing everything possible to efficiently manage supply. With the performance of the water distribution network a top priority for SEW, the company needed a solution that was simple to install and operate, and that could be deployed quickly and efficiently.

### The solution

To combat this immediate challenge and provide future demand control, leakage reduction and customer service improvements, South East Water made the decision to implement i2O's Advanced Pressure Management solutions in two hundred District Metered Areas (DMAs).

The i2O technology would enable South East Water to automatically and continuously optimise pressure in pressure managed zones. The technology automatically optimises zones from an initial fixed pressure, implementing flow modulation as required to minimise pressures while providing high confidence that specified levels of service are maintained.

These results are achieved through the combination of an intelligent PRV controller and a sophisticated, automatically generated control model. The control model is supplied 'over the air' from i2O software that learns the network head loss characteristics and automatically adapts to changes.



Pondhall DMA demonstrating how i2O's solution safely reduced pressure, eliminating excess pressure and stabilising service - Courtesy of SEW



# THE SIX BENEFITS OF OPTIMISING WATER NETWORK PRESSURE

LEAKAGE REDUCTION,  
TYPICALLY **20%**

BURST FREQUENCY  
REDUCTION,  
TYPICALLY **40%**

OPERATIONAL COST  
SAVINGS, TYPICALLY  
**40%** LESS 'FIND &  
FIX' ACTIVITY

EXTENDED ASSET  
LIFETIMES, **5** YEARS  
OR  
MORE

IMPROVED  
CUSTOMER SERVICE,  
FEWER COMPLAINTS

ENERGY SAVINGS,  
TYPICALLY **20%**

## ADVANCED PRESSURE MANAGEMENT

i2O's Advanced Pressure Management solutions enable water companies to optimise the performance of their distribution networks by accurately controlling pressure. Our fully integrated portfolio of upgradeable solutions provide: Network visibility and intelligence > Remote control > Automatic optimisation.

With i2O, water companies can provide a better service to their customers while saving money.

For more information please contact:

Tel: +44 (0) 2380 111 420

E-mail: [info@i2Owater.com](mailto:info@i2Owater.com)

[www.i2Owater.com](http://www.i2Owater.com)

The solution provides both fully automatic and semi-automatic modes, optimisation configuration and reporting tools. The system uses an adaptive open-loop architecture that avoids the reliability and energy consumption issues of closed-loop designs and delivers a more accurate, robust control mechanism.

South East Water had been trialing i2O's Automatic PRV Pressure Optimisation solution on the Pondhall DMA and had seen significant demand and leakage reductions combined with reduced repair and maintenance activity.

### i2O's Automatic Optimisation

Continuous, automatic optimisation delivers a stable target pressure, driving out excess pressure from pressure managed zones. Minimising average and maximum pressures reduces leakage and burst frequency, as well as associated costs for operational tasks such as repairs and leakage control.

Lowering pressures and calming pressure fluctuations also extends the lifetime of mains and service connections. The precise control of pressure delivers a consistent service level to the customer, further enhanced by the automatic re-adjustment of pressures in response to network events or changes in demand characteristics.

i2O's automatic optimisation solution forms part of an integrated portfolio of solutions for Advanced Pressure Management that enable water companies to optimise the performance of their distribution networks.

As well as automatic optimisation of both PRVs and pumps, these solutions also provide network visibility and intelligence, and remote control of PRVs and pumps to improve operational efficiency and customer satisfaction.

### Installation

In May 2012 installation of the i2O technology began, carried out by two office based and six field based South East Water engineers and technicians, with training and support given by the team at i2O Water. The planned programme for deployment was based on a technician installing two systems per day.

As the programme began, the team quickly realised they were facing some operational challenges that led to the requirement of unplanned enabling and survey works:

- Ducting between pits.
- Flow meter repair/replacement.
- Incorrectly-sized PRVs.
- Poorly located PRVs.

This resulted in the team being able to install one system per day rather than two, as initially planned. Once these challenges had been identified the South East Water team brought in additional technicians to carry out the enabling works and bring the installation plan back on track.

Prior to starting the installation and optimisation of the systems, South East Water had set targets for the 200 (No.) systems of realising 3ML/d reduction in leakage and 6ML/d in open tap demand.

### The results

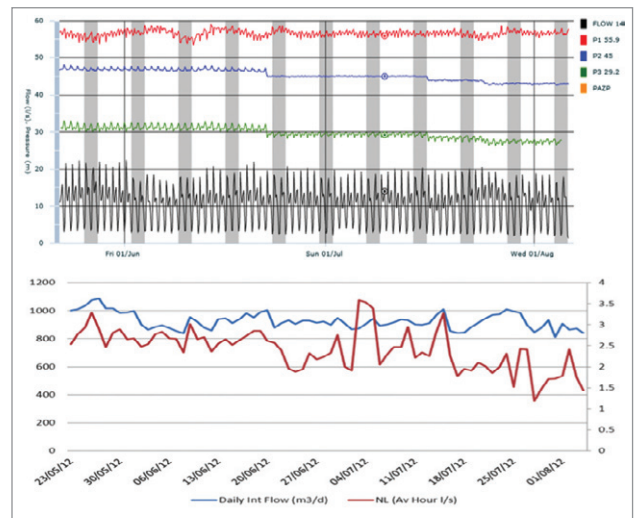
At the time of writing (June 2013), 148 (No.) systems are fully optimised and have delivered the following results:

- 6.7m reduction in Average Zonal Pressure (AZP).
- 17.7% reduction in AZP.
- Reduction in Nightline of 48.5 l/s.
- Leakage reduction based on MNF 3.3ML/d, TDF 4.9ML/d.

Here are some examples of the system performance:

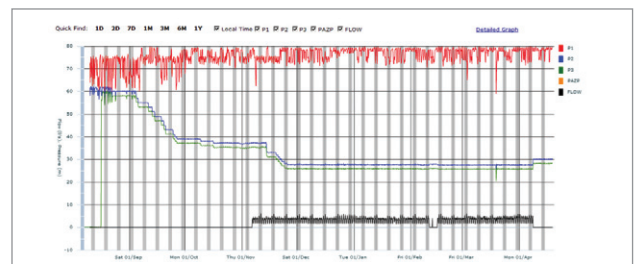
### Demand Reduction: Bushy Wood DMA

In the graphs below you can see a reduction in the night line of 1.25 litres per second, and reduction of 180 cubic metres per day on daily demand, achieved by reducing the PRV outlet pressure by 3m.



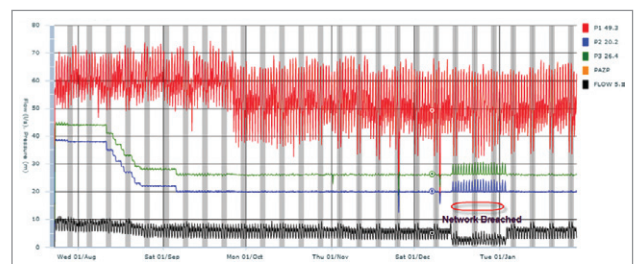
### Smooth Control: Hothfield Common

In this graph you can see how the solution has gradually and safely reduced pressure.



### Network visibility

Another key aspect of the i2O technology is the ability to remotely detect anomalies within the network, with supporting data and graphs to analyse any network events. This enables South East Water to accurately identify issues and respond rapidly, with the best use of resources. This graphs shows a network breach, which was quickly identified using the i2O software.



Extrapolated to the 200 (No.) systems, South East Water is predicting:

- Reduction in Nightline of 67.5 l/s.
- Leakage reduction based on MNF 5.2ML/d, TDF 7.7ML/d.

In addition to the demand and leakage benefits, SEW is now examining the reduction in mains bursts, along with associated reductions in repair and operations costs, and positive impact on customer service. Based on the success of the project with i2O, SEW is now looking at applying Advanced Pressure Management technology to pump-fed zones in the distribution network.

*The Editor & Publishers would like to thank South East Water and i2O Water Ltd for providing the above article for publication.*