

Plumbosolvency

Thames Water install plant to meet new regulations

by

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Where lead is in contact with water, as is the case with lead communication pipes and some internal plumbing, it tends to dissolve into solution over time (plumbosolvency). The 1998 Drinking Water Directive and the Water Supply & Water Quality Regulations 2000 require water companies to reduce lead concentrations at customers' taps. In advance of AMP3, the DWI specified that treatment to reduce plumbosolvency should be considered where more than 10% of the samples taken in a zone exceed $10\mu\text{l}$. Subsequently, the DWI clarified its guidance on what will constitute compliance and, in April 2000, the criterion was tightened to include works where more than 5% of lead samples exceed $10\mu\text{l}$, rather than the previous 10%.



Small treatment plant to control plumbosolvency (courtesy Thames Water Utilities Ltd)

The new standards for lead are to be $25\mu\text{l}$ by the end of 2003 and $10\mu\text{l}$ by the end of 2013. Although this standard does not take full effect until 2013, national legislation requires optimisation by the end of 2003. To facilitate compliance with the $10\mu\text{l}$ standard, and to minimise national expenditure on replacing lead communication pipes, the DWI requires the provision of new treatment plant to control plumbosolvency by no later than December 2002.

Options

To achieve the new limits a number of options were considered.

- * orthophosphoric acid dosing;
- * pH correction;

- * orthophosphoric acid dosing and pH correction;
- * replace lead service pipes;

Preferred solution

For distribution zones where lead piping is present in significant quantities, the preferred solution is to dose orthophosphoric acid at the source treatment works. Over time, a layer of phosphate forms on the inner surface of the lead pipes, reducing the lead absorption rate.

In Thames Water's supply area, dosing plant is being installed at the five large London treatment works at Coppermills in the Lee Valley and in South London at Ashford Common,

Kempton, Hampton and Walton. In addition plant is being installed at 38 smaller sites, 24 of which are in the London area.

The small works are, predominantly, borehole sites with naturally low phosphate levels, whereas the five large London works are surface water sites with higher background concentrations which vary seasonally. Where there are no coagulation processes in use at a treatment works, this phosphate is also present in the treated water supplied at similar levels to that in the raw water sources. From investigations, this phosphate has been shown to be predominantly available phosphate. Therefore, the background phosphate in the treated water must be taken into account when calculating the final dose of phosphate.

Technical scope

The packaged plant, being procured from *Tyco* in Norwich, includes the following items:

- * kiosk & base slabs;
- * pipework & valves to facilitate acid deliveries from road tankers;
- * bulk storage tanks within bund;
- * chemical dosing rig for each treatment works stream with integral bund;
- * carrier water break tank and pump sets to provide dilution and mixing;
- * for the large works, automatic on-line orthophosphate analysers;
- * safety shower and eye baths;
- * wash down hose reel at tank filling point;
- * intruder detection system for dosing plant building;
- * protection from freezing;
- * process control panel;
- * interface with treatment works SCADA system.

Project management

The project is managed by Thames Water's Engineering division. design and site management for the London works is through Thames Water's *Trident South Alliance* with *Costain*, the design element by their partner *Binnie Black & Veatch*. Design and site management for the provinces sites is by Thames Water's *Trident West Alliance* with *Gleeson*, the design element being through their partner *Montgomery Watson*. The contracts are target cost. Close liaison and cooperation is maintained throughout and across the project teams.

Day to day construction management is through *Costain* and *Gleeson*, with overall Construction and Commissioning management by Thames Water's Engineering division.

Monitoring of customer contact levels and water quality will be maintained throughout the implementation period, and optimisation is managed through Thames Water's *Water Quality Group*.

Progress

Several sites have been commissioned, with several more being at various stages of design, manufacture and installation. The overall project completion for optimisation is December 2003, with all plant to be commissioned by December 25, 2002. the forecast final cost is approximately £14.5m and the projects remain within both cost and time targets.■

Note: *The author of this article, Ed Pemberton, is Water Programme Manager with Thames Water Utilities Ltd.*
