**The Alberta lead in drinking water demonstration project**

Article by Dr Colin Hayes, a Director at YOULEARNWATER LTD, July 2016

*The demonstration project evaluated a range of sampling methods and supporting techniques for tackling lead in drinking water in Alberta Province. It concluded that a risk assessment/management approach would be better suited to tackling the lead in drinking water problem than the sampling protocols currently recommended by Health Canada. This article is a preview of the paper to be published next month in the Journal of Water Supply: Research and Technology – AQUA.*

The basic problem is that sampling lead in drinking water is fraught with difficulties. Lead concentrations at the tap are highly variable, reflecting the many changes in contact time between drinking water and lead bearing materials, arising from household water use patterns. The problem in a City or Township is further complicated by significant variation from home to home due to widely different pipework circumstances. In consequence, surveys based on samples taken after a stagnation period, whether it be over-night standing of 30 minutes stagnation, give variable results with up to five-fold differences. The sampling protocols specified in Health Canada’s 2009 Guidance are not capable of providing a reliable assessment of whether or not corrosion control treatment is needed and no basis whatsoever for its optimisation. The Alberta demonstration project set out to investigate these problems and evaluate alternatives.

Sequential sampling (12 x 1 litres) at six homes in both Calgary and Edmonton indicated that peak lead concentrations, after 30 minutes stagnation and after over-night standing, typically occurred in the 4th to 6th litre sample. Sampling protocols that only require the first litre, or only require a limited number of litre samples, clearly may under-estimate the peak lead concentration at a home. In the homes which had a lead service line, the peak lead concentration varied by up to ten-fold. Such home to home variation is significant because periodic surveys are inevitably made up from different homes from the sampling pool, at least to some extent.

The additional techniques used were:

* Diagnostic assessments of the circumstances in each city;
* Laboratory based plumbosolvency testing, which investigated orthophosphate dose responses;
* XRD analysis of lead pipe scales;
* Compliance modelling for predicting the likely benefits of corrosion control treatment.

Risk assessment and risk management approaches (drinking water safety plans) are a requirement for the larger water supply systems in Alberta and it was concluded that these provided the right platform for tackling the lead in drinking water problem. Within a water safety plan framework it was concluded that a range of sampling methods could be used to investigate specific circumstances, supported by investigative techniques appropriate to the circumstances of the water supply system.

A specialist on-line training course on minimising lead in drinking water is available from [www.youlearnwater.com](http://www.youlearnwater.com) TWN members are entitled to a 20% discount (code TWNK20).

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About the Author: Dr Colin Hayes has worked on the lead in drinking water problem for over 35 years, as practitioner, consultant and researcher. He has published numerous journal papers and books on the topic and undertaken projects in Canada and the US in addition to the UK, Ireland and Portugal. E-mail: colinhayes@youlearnwater.com