

## **BORON IN DRINKING WATER**

### **SUMMARY**

- **UK water suppliers place the highest priority on assuring the quality of water provided to their customers.**
- **Boron occurs widely in the water environment and derives mainly from natural sources. It can also be present in many river waters receiving treated wastewater due to its widespread use as a bleaching agent in detergent formulations**
- **The EU standard is 1 mg/l based on advice the EU and other expert advisory groups. It is believed that no drinking water exceeds this level in the UK**
- **It is extremely difficult to treat water to remove boron by conventional treatment processes. Although very unlikely, significant tightening of the boron standard would require changes to the formulation of certain detergents.**

### **TECHNICAL BACKGROUND**

#### **Where does boron come from?**

Boron is a highly soluble element, which occurs widely in water sources as a consequence of leaching from the rocks through which water percolates. Higher concentrations may occur in deep water wells situated in the carboniferous limestone.

Boron can also reach water sources from a number of industrial processes. It is commonly found in domestic treated wastewater where it derives from use as a bleaching agent (perborate) in some detergents. The concentrations of boron from this source have been falling with the development of new detergent formulations.

Boron is naturally present in vegetables and is, therefore, consumed widely with no indication of any ill effects.

#### **What standards apply to boron in drinking water?**

WHO published a guideline value of 0.5 mg/l in 1993 but this was designated provisional in 1998 because of the difficulty of treatment with currently available technology. More recently, new data on the toxicology of boron has been considered by another WHO expert group, the European Expert Committee on Toxicity and Ecotoxicity and the US Environmental Protection Agency. These groups all considered that a higher value was appropriate and a standard for drinking water was set at 1 mg/l in Directive 98/78, which

came into force in 2004. The new standard is considered to provide good levels of public health protection.

***How is the quality of drinking water assured?***

Drinking water in the UK is regularly monitored and does not exceed the new standard of 1 mg/l.

In the unlikely event that it did, water suppliers would take appropriate action to ensure compliance. If exceedance was due to an industrial source then control of environmental emissions would be the best solution. This is because removal of boron from drinking water is extremely difficult and would require very specialised and expensive techniques. If elevated levels of boron are naturally occurring then alternative sources of water, or blending with low boron water, might be necessary.