



## **Tungsten – Guidance for Local Authorities**

### **Description and Background**

Tungsten is a grey / white metal with exceptional strength and high melting point. In the environment it is found as a compound with other elements, its most common ores being wolframite and scheelite. China is the largest producer of tungsten ore, with quantities also mined in Canada and Russia. It is unlikely to be encountered frequently in drinking water. Where it does occur naturally, deposits are likely to be localised. Due to its strength tungsten has many uses in alloys with other metals.

Its very low solubility in most forms meant that it has not historically been considered a large risk in drinking water, however there is some suggestion that this assumption is not consistently correct, and that under certain conditions aqueous forms of tungsten may be an issue<sup>1</sup>. Significant concentrations of tungsten in drinking water wells have been found in parts of Nevada<sup>2</sup>.

### **Affected Areas**

#### **Contamination Sources**

Most likely man-made sources of contamination are existing or former metal working plants, although tungsten's use as a metal alloy means almost any industrial area working with metallic substances could be a source. Firing ranges and war zones (tungsten is used in bullets) could also result in environmental contamination.

### **Health Significance**

Tungsten's health impacts due to ingestion have not been fully quantified, and what information exists is primarily related to occupational exposure<sup>3</sup>. There is the suspicion that oral ingestion of tungsten may cause developmental abnormalities in foetuses. It may also accumulate in bones.

The WHO does not set a guideline value for tungsten. Most countries have not set a standard for tungsten in drinking water.

### **Risk Assessment and Monitoring**

The Private Water Supply Regulations do not require routine monitoring for tungsten. However the Regulations require that the water does not contain any substance at a concentration or value which would constitute a potential danger to public health. If the monitoring local authority considers that tungsten may be present it would be prudent to include it during audit monitoring.

## **Treatment**

Few options have been established, but USEPA suggests that traditional coagulation and clarification processes are very effective at lower pHs (<6). However these technologies are not usually suited to the smallest supplies. Using a water soluble polymer to complex anionic forms of tungsten prior to removal by ultrafiltration has also shown some success.

Treatment options at point of use are largely unknown – ion exchange methods may be worth exploring once the chemistry of the tungsten present has been understood.

## **References / Further reading**

<sup>1</sup>U.S. EPA 2009. Emerging Contaminant – Tungsten Fact Sheet, EPA 505-F-07-005.

<sup>2</sup> Walker, M. and Fosbury, D. 2009. Arsenic, As (III), and Tungsten in Nevada County's Private Water Supplies. *J. Water Health*. Jun; 7 (2): 293-301.

<sup>3</sup>ASTSWMO 2011 Tungsten Issues Paper (CAS ~7440-33-7) Version 2.0 Federal Facilities Research Center Policy & Technology Focus Group Association of State and Territorial Solid Waste Management Officials

## **FAQ Fact Sheet for Owners and Users**

To be developed if necessary