



Antimony – Guidance for Local Authorities

Description and Background

Antimony is a metalloid element that is rarely found in naturally occurring deposits in the UK, although some minor deposits of the ore Stibnite are known from parts of Dumfries and Galloway, especially around Langholm. Industrially, main uses of antimony include fire retardant chemicals and as a replacement for lead in some soldering alloys which may be used in plumbing – this may be one of the main routes by which it can enter drinking water. Additionally, there has been evidence that detectable quantities of antimony may leach from PET plastic bottles, and it would be reasonable to consider contamination of samples via this route at an early stage should a failure occur.

Health Significance

The toxicity of antimony depends on the form in which it is found. The soluble form antimony (III) is generally considered to be the most toxic. WHO have set a guideline value of 20 µg/l in drinking water. The regulatory PCV is 5 µg/l.

Risk Assessment and Monitoring

The Private Water Supply regulations require regular monitoring for antimony where it is present at more than 75% of the PCV.

What if it fails?

It is comparatively unusual to encounter a failure for Antimony and a full investigation of the source of the failure should be undertaken.

Check the following:

- Are the sample bottles used, approved for metals analysis (some PET can leach antimony)?
 - Consider re-sampling using different bottles, taking advice from the analysing laboratory.
- Could the antimony be derived from metal plumbing fittings?
 - Resample upstream and downstream of any suspect fittings
- If the antimony is suspected to be in the source, investigate for any industrial pollution, especially for dumped materials containing metals, micro-electronics or flame retardants

Options for resolving at source

Where there is an obvious point source of industrial origin, it may be possible to reduce the concentration of antimony in the water by identifying and removing the contamination. If contamination is more widespread or the antimony is naturally

occurring, this may be less feasible and the only option may be to locate an alternative source.

If the source of the contamination is identified as being leaching from plumbing fittings, replacement of these with approved plumbing fittings not containing antimony should provide a resolution. Improved conditioning of the water so that it is less corrosive to metals may help reduce concentrations but is unlikely to provide a long term resolution.

Treatment

In the UK, treatment for antimony is unlikely to be required nor economically viable.

The two most viable treatment solutions are

- **Coagulation and Filtration**
Although the chemistry of antimony is complex it is likely that most forms will bind to aluminium or iron flocs that form in conventional coagulation processes and will, accordingly, be removed as part of the process.
- **Reverse Osmosis Membrane (RO)**
This method provides reliability with minimal use of chemicals. However, issues such as fouling of the membrane and disposal of the waste stream may need to be considered. Low pressure RO units lose a significant proportion of the incoming water flow as waste, which may be an issue where water resources are tight. Additionally, RO will remove almost all natural salts dissolved in the water, rendering it almost equivalent to distilled water. Although this level of purity may seem superficially attractive, it does mean that the water may not taste very palatable to some consumers. It will also make the water highly corrosive to many plumbing materials, and this should be borne in mind. Re-mineralisation of the water is possible using special filters after the RO unit. Specialist advice should be sought in the consideration and siting of point of use RO treatment.

Additionally, there is some evidence that adsorption onto ferric oxide media may provide effective removal, in much the same way as this has been used to treat arsenic. This may provide an economic and relatively simple means of treating antimony in small supplies, however “off the shelf” treatment equipment may not be available on a suitable scale.

FAQ Fact Sheet for Owners and Users

To be developed if necessary

Antimony in Drinking Water (2003): Background document for the development of WHO *guidelines for Drinking Water Quality*, **WHO/SDE/WSH/03.04/74**

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REMOVAL OF ANTIMONY
FROM WATER BY SORPTION
MATERIALS

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