

PLAINTIFF'S EXHIBIT

CAP-635

GUIDELINES FOR DRINKING-WATER QUALITY

Volume 1
Recommendations



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this document are based upon the selection of an acceptable risk of less than 1 additional case of cancer per 100 000 population assuming a daily consumption of 2 litres of drinking-water by a 70-kg man. The cancer risk associated with other concentrations of these substances can be readily calculated.

4.1.3.4 Apportionment of intake

Drinking-water is not the only source from which man is exposed to many of the chemical constituents for which guideline values have been set. In many cases the intake from drinking-water may be small in relation to the intake from food and air. It was accepted that, in the evaluation of the health effects of inorganic constituents, all routes of exposure (air, food, and water) had to be considered when deciding upon a value for drinking-water. This, in some cases, proved to be problematical because of the lack of information concerning the biological availability of the contaminants present in foodstuffs.

However, in the case of chemicals for which carcinogenicity is the main concern and for which the guidelines have been based upon low-dose extrapolation techniques in order to equate the recommended value with an incremental cancer risk, other sources of exposure have not been considered. The incremental risk from food, air, occupation, etc., will be additional to that from drinking-water.

As regards pesticides, a special situation exists. In this case, the ADI has already been "used up" in setting tolerances for pesticide residues in foods. On the other hand, measurable quantities (although usually at very low concentrations) are frequently found in drinking-water. Therefore in setting guideline values for pesticides in drinking-water, values were generally based on committing not more than 1% of the ADI. This was considered acceptable on the grounds that not all food will contain pesticides at the permitted tolerance levels.

4.2 Health-related inorganic constituents

A series of working papers dealing with the health effects of 37 inorganic constituents occurring in drinking-water were studied in order to decide upon guideline values for the undesirable inorganic substances in drinking-water (Table 7).

4.2.1 Guideline values recommended

On the basis of the health-related data concerning the 37 inorganic constituents examined it was decided that, at the present time, guideline values could be recommended for only 9 of them (Table 8), and the evidence is summarized in section 4.2.2.

However, since the effects on health of several other constituents in the list are the subject of current debate, brief explanations of the

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Table 7. Inorganic constituents of potential health significance

Constituent	Guideline values set	Background document drafted	Retained for consideration of aesthetic and organoleptic aspects	No action required
aluminum			X	
antimony				X
arsenic	X	X		
asbestos		X		
barium		X		
beryllium		X		
boron				X
cadmium	X	X		
chromium	X	X		
cobalt				X
copper			X	
cyanide	X	X		
ferrocyanide				X
fluoride	X	X		
hardness (calcium and magnesium)		X	X	
iron			X	
lead	X	X		
lithium				X
magnesium			X	
manganese			X	
mercury	X	X		
molybdenum				X
nickel		X		
nitrate	X	X		
nitrite				X
selenium	X	X		
silver		X		
sodium		X	X	
tellurium				X
thallium				X
thiocyanate				X
tin				X
titanium				X
tungsten				X
uranium				X
vanadium				X
zinc			X	

reasons why guideline values could not be recommended are also provided in section 4.2.2 for 7 other constituents.

Eight of the constituents listed in Table 7, although not of direct health concern, could have an indirect effect upon health because of their effect on the aesthetic quality of drinking-water. These substances are dealt with later under "Aesthetic and organoleptic aspects" (page 77).

Table 8. Guideline values for health-related inorganic constituents

Constituent	Guideline value (mg/litre)
arsenic	0.05
cadmium	0.005
chromium	0.05
cyanide	0.1
fluoride	1.5 ^a
lead	0.05
mercury	0.001
nitrate (as N)	10.00
selenium	0.01

^a Guideline value may vary depending upon climatic conditions and water consumption.

4.2.2 Summaries of the evidence used in setting guideline values

4.2.2.1 Arsenic

Based on human health data, a concentration of 50 µg of arsenic per litre is not associated with any adverse health effects. Estimates have been made of the risk of cancer from low intakes of arsenic, but these are very uncertain. At an arsenic concentration of 50 µg/litre, the contribution made by water to the total intake will normally be about one-half to two-thirds; for very low dietary intakes of arsenic, the proportion provided by water may be somewhat higher. Arsenic in drinking-water will normally be the main source of inorganic arsenic. An arsenic concentration of 0.05 mg/litre is recommended as a guideline value.

4.2.2.2 Asbestos

The health hazards associated with occupational exposure to airborne asbestos have been well documented. Epidemiological studies suggest that prolonged inhalation of asbestos also leads to an increased incidence of cancer of the gastrointestinal tract; however, it is not known whether such an effect is systemic or results from swallowing inhaled fibres.

The harmful effects of swallowed asbestos on human health have not been determined. Studies in progress should permit a more complete evaluation of any hazard resulting from the swallowing of asbestos, but available data are, at present, insufficient to determine whether a guideline value is needed.

4.2.2.3 Barium

There is no firm evidence of any health effects associated with the normally low levels of barium in water. Even at a barium concentration