Trichloroacetic acid has been shown to induce tumours in the liver of mice. It has given mixed results in in vitro assays for mutations and chromosomal aberrations and has been reported to cause chromosomal aberrations in in vivo studies. IARC has classified trichloroacetic acid in Group 3, not classifiable as to its carcinogenicity to humans. The weight of evidence indicates that trichloroacetic acid is not a genotoxic carcinogen.

Trichlorobenzenes (total)

Releases of trichlorobenzenes (TCBs) into the environment occur through their manufacture and use as industrial chemicals, chemical intermediates and solvents. TCBs are found in drinking-water, but rarely at levels above 1 µg/l. General population exposure will primarily result from air and food.

Reason for not establishing a guideline value	Occur in drinking-water at concentrations well below those of health concern, and health-based value would exceed lowest reported odour threshold
Assessment date	2003
Principal reference	WHO (2003) *Trichlorobenzenes in drinking-water*

The TCBs are of moderate acute toxicity. After short-term oral exposure, all three isomers show similar toxic effects, predominantly on the liver. Long-term toxicity and carcinogenicity studies via the oral route have not been carried out, but the data available suggest that all three isomers are non-genotoxic.

A health-based value of 20 µg/l can be calculated for total TCBs on the basis of a TDI of 7.7 µg/kg body weight, based on liver toxicity identified in a 13-week rat study, taking into consideration the short duration of the study. However, because TCBs occur at concentrations well below those of health concern, it is not considered necessary to derive a formal guideline value. It should be noted that the health-based value exceeds the lowest reported odour threshold in water.

1,1,1-Trichloroethane

1,1,1-Trichloroethane is widely used as a cleaning solvent for electrical equipment, as a solvent for adhesives, coatings and textile dyes and as a coolant and lubricant. It is found mainly in the atmosphere, although it is mobile in soils and readily migrates to groundwaters. 1,1,1-Trichloroethane has been found in only a small proportion of surface waters and groundwaters, usually at concentrations of less than 20 µg/l; higher concentrations (up to 150 µg/l) have been observed in a few instances. There appears to be increasing exposure to 1,1,1-trichloroethane from other sources.

Reason for not establishing a guideline value	Occur in drinking-water at concentrations well below those of health concern
Assessment date	2003
Principal reference	WHO (2003) *1,1,1-Trichloroethane in drinking-water*

1,1,1-Trichloroethane is rapidly absorbed from the lungs and gastrointestinal tract, but only small amounts—about 6% in humans and 3% in experimental animals—are metabolized. Exposure to high concentrations can lead to hepatic steatosis (fatty liver) in both humans and laboratory animals. In a well-conducted oral study in mice and rats, effects included reduced liver weight and changes in the kidney consistent with hyaline droplet neuropathy. IARC has placed 1,1,1-trichloroethane in Group 3. 1,1,1-Trichloroethane does not appear to be mutagenic.

A health-based value of 2 mg/l can be calculated for 1,1,1-trichloroethane on the basis of a TDI of 0.6 mg/kg body weight, based on changes in the kidney that were consistent with hyaline droplet nephropathy observed in a 13-week oral study in male rats, and taking into account the short duration of the study. However, because 1,1,1-trichloroethane occurs at concentrations well below those of health concern, it is not considered necessary to derive a formal guideline value.

Trichloroethene

Trichloroethene (TCE) is used primarily in metal degreasing. However, its use has been substantially declining since the 1990s as a result of increased environmental regulations on TCE emissions. It is emitted mainly to the atmosphere, but it may also be introduced into groundwater and, to a lesser extent, surface water in industrial effluents. Poor handling and improper disposal of TCE in landfills have been the main causes of water contamination. Higher levels of TCE are expected in groundwater than in surface water because of the lack of volatilization that occurs from groundwater. Therefore, the most relevant routes of exposure are considered inhalation of contaminated air and ingestion of contaminated drinking-water, particularly from groundwater sources.

Guideline value	0.008 mg/l (8 µg/l)
Occurrence	Typically present at low or undetectable concentrations in surface water (≤1 µg/l) due to high volatility and continued decline in TCE production. Concentrations may be higher (usually below 100 µg/l) in groundwater systems where volatilization and biodegradation are limited.
TDI	0.5 µg/kg bw, based on the TDI values derived from three key studies showing decreased thymus weight in female mice, increased incidence of developmental immunotoxicity in mice and increased incidence of fetal cardiac malformations in rats. The narrow range of TDIs among the three key studies was further supported by two other studies in rats evidencing renal effects. Where applicable, uncertainty factors were applied to the points of departure from each of the three studies to account for interspecies differences, intraspecies variation and use of a LOAEL instead of a NOAEL.
Limit of detection	0.01 µg/l by GC with ECD after liquid–liquid extraction; 0.01–3.0 µg/l by purge-and-trap capillary GC with PD or with PD and ECD in series; and 0.5 µg/l by purge-and-trap capillary GC-MS