WATER POLLUTION and CONTROL

Inorganic variables

Sulphide

* Sulphide enters groundwaters as a result of the decomposition of sulphurous minerals and from volcanic gases.
* Sulphide formation in surface waters is principally through anaerobic, bacterial decay of organic substances in bottom sediments and stratified lakes and reservoirs.

Silica

* Silica is widespread and always present in surface and groundwaters. It exists in water in dissolved, suspended and colloidal states.
* Dissolved forms are represented mostly by silicic acid, products of its dissociation and association, and organosilicon compounds.
* Reactive silicon (principally silicic acid but usually recorded as dissolved silica (SiO_2) or sometimes as silicate (H_4SiO_4)) mainly arises from chemical weathering of siliceous minerals.

Silica

* Silica may be discharged into water bodies with wastewaters from industries using siliceous compounds in their processes such as potteries, glass works and abrasive manufacture.
* Silica is also an essential element for certain aquatic plants (principally diatoms). It is taken up during cell growth and released during decomposition and decay giving rise to seasonal fluctuations in concentrations, particularly in lakes.

Fluoride

* Fluoride originates from the weathering of fluoride-containing minerals and enters surface waters with run-off and groundwaters through direct contact.

* Fluoride mobility in water depends, to a large extent, on the Ca_2+ ion content, since fluoride forms low solubility compounds with divalent cations. Other ions that determine water hardness can also increase F- solubility.

Boron

* Boron is a natural component of freshwaters arising from the weathering of rocks, soil leaching, volcanic action and other natural processes. Industries and municipal wastewaters also contribute boron to surface waters. In addition, agricultural run-off may contain boron, particularly in areas where it is used to improve crop yields or as a pesticide.

* Boric acid, which does not readily dissociate, is the predominant species in freshwaters.

* Despite its widespread occurrence, boron is usually present in natural waters in comparatively low concentrations. Average concentrations in surface waters do not exceed 0.1 mg l-1 and only reach 1.5-3 mg l-1 in a few areas.

Cyanide

* Cyanides occur in waters in ionic form or as weakly dissociated hydrocyanic acid. In addition, they may occur as complex compounds with metals.

* The toxicity of cyanides depends on their speciation; some ionic forms and hydrocyanic acid are highly toxic. The toxicity of complex compounds of cyanide depends on their stability. Weak complexes formed with metals such as zinc, lead and cadmium are extremely toxic. Copper complexes are less toxic, and cobalt and ferrous complexes are only weak toxicants.

Some confidence limits of pesticides in water ecology

Pestisit	Confidence limits (ppb)
Aldrin	0,03
BHC	4,0
	0,08
Klordan	0,01
	0,0043 (freswater)
	0,004 (seawater)
DDT	0,001
Dieldrin	0,003
	0,0019
Endrin	0,004
	0,0023
Heptaklor	0,001

References

Anonymous 1996. Water Quality Assessments - A Guide to Use of Biota, Sediments and Water in Environmental Monitoring - Second Edition Ed. by Deborah Chapman 651 pages published on behalf of WHO by F & FN Spon 11 New Fetter Lane London EC4) 4EE.

Taken from http://www.nios.ac.in/media/documents/313courseE/L34.pdf