Arsenic

What it is:

- ***Chemical symbol:*** As
- ***Atomic number:*** 33
- Odorless, tasteless semi-metal element
- Can enter drinking water naturally through the erosion of natural deposits in the earth
- Also enters drinking water through agricultural and industrial runoff.

Ionic states:

In groundwater, arsenic generally occurs in two forms: trivalent arsenic (As^{+3}, or arsenite) or pentavalent arsenic (As^{+5}, or arsenate). Although both forms are harmful to human health, trivalent arsenic is more harmful and more difficult to remove from water. Trivalent arsenic can be converted into pentavalent arsenic in the presence of an effective oxidant such as free chlorine. Treatment with chloramines will not ensure a complete conversion of trivalent arsenic to pentavalent arsenic.

Where found:

- Arsenic is abundant in the Earth's crust. It is present in many different minerals, the most common of which is arsenopyrite.
- Arsenic is also found in the atmosphere. One-third has entered naturally, most from volcanic eruption. The rest is from industrial emissions.
- Geological inorganic arsenic is especially present in Taiwan, Bangladesh and India.
- Organic arsenic is mainly found in sea-dwelling creatures.

Health effects:

- Stomach pain, nausea, vomiting, diarrhea
- Partial paralysis, numbness in hands and feet, blindness, thickening and discoloration of the skin
- Cancer of the bladder, lungs, skin, kidneys, nasal passages, liver and prostate.

Regulation:

- US Environmental Protection Agency (EPA) maximum contaminant level (MCL) = 10 micrograms/liter (parts per billion). This enforceable MCL became effective January 23, 2006, for both organic and inorganic forms.
- EPA MCL goal = zero

Water treatment:

- Ion exchange
- Reverse osmosis
- Distillation.

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Sources: US EPA, industry sources.