

**PRIMARY DRINKING WATER CONTAMINENTS**

| <u>Contaminants</u>        | <u>Maximum Contaminant Level<br/>mg/L</u> | <u>Health Effects</u>  | <u>Treatment</u>   |
|----------------------------|---|--|--|
| <b>INORGANIC CHEMICALS</b> |   |  |  |
| Arsenic                    | 0.05                                      | Malignant tumors of skin and lungs. Affects the nervous system.                  | Activated alumina, ion exchange, lime softening, RO, coagulation with filtration, distillation.                              |
| Asbestos                   | 7 MFL                                     | Probably cause of cancer.  | Filtration, RO, distillation.  |
| Barium                     | 2.0                                       | Affects nervous and circulatory systems  | Ion exchange, lime softening, RO, distillation.  |
| Cadmium                    | 0.005                                     | Kidney disorders, bronchitis, anemia.  | Ion exchange, RO, coagulation with filtration, lime softening, distillation, corrosion control.                              |
| Chromium (total)           | 0.1                                       | Liver and kidney disorders. Affects skin and digestive system.                   | Coagulation with filtration, ion exchange lime softening, RO, distillation.  |
| Copper                     | 1.3 (action level)                        | Stomach and intestinal distress. Wilson's disease.                               | Ion exchange, RO, distillation.  |
| Fluoride                   | 4.0                                       | Fluorosis or mottling, a brown discoloration of the teeth.                       | Ion exchange, RO, distillation, activated alumina.   |
| Lead                       | 0.015 (action level)                      | Affects nervous and reproductive systems and kidneys. Causes hypertension.       | Ion exchange, RO, coagulation with filtration, distillation, corrosion control, carbon.                                      |
| Mercury                    | 0.002                                     | Affects nervous system.  | Granular activated carbon, lime softening, RO, coagulation with filtration and with powdered activated carbon, distillation. |
| Nitrate (as N)             | 10  | Methemoglobinemia ("Blue Baby" syndrome)   | Ion exchange, RO, distillation.  |
| Nitrite (as N)             | 1.0                                       | Methemoglobinemia ("Blue Baby" syndrome)   | Ion exchange, RO, distillation.  |
| Selenium                   | 0.05                                      | Affects nervous system. Causes irritation to the mucous membrane and dermatitis. | Distillation, lime softening, coagulation with filtration, RO, activated alumina.  |
| Sodium                     | none (20 mg/l reporting level)            | Possible increased blood pressure in susceptible individuals.                    | Ion exchange, RO, distillation.  |
| <b>ORGANIC CHEMICALS</b>   |   |  |  |
| Acrylamide                 | TT  | Affects nervous system. Probable cause of cancer.                                | Granular activated carbon.   |
| Benzene                    | 0.005                                     | Leukemia, anemia and possible cancer.  | Granular activated carbon.   |

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| Carbon Tetrachloride        | 0.005                            | Affects nervous system, liver and digestive system. Causes cancer.                          | Granular activated carbon.             |
| Dibromochloropropane (DBCP) | 0.0002                           | Probable cause of cancer.   | Granular activated carbon.             |
| p-Dichlorobenzene           | 0.075                            | Affects nervous system, kidneys and liver. Probable cause of cancer.                        | Granular activated carbon.             |
| o-Dichlorobenzene           | 0.6                              | Affects lungs, liver, and kidneys.  | Granular activated carbon.             |
| 1,2-Dichloroethane          | 0.005                            | Causes damage to kidneys and liver, can cause nausea.                                       | Granular activated carbon.             |
| 1,1 Dichloroethylene        | 0.007                            | Affects kidneys and liver and can cause cancer.   | Granular activated carbon.             |
| cis-1,2-Dichloroethylene    | 0.07                             | Affects liver, nervous and circulatory systems.   | Granular activated carbon.             |
| trans-1,2-Dichloroethylene  | 0.1                              | Affects liver, nervous and circulatory systems.   | Granular activated carbon.             |
| 1,2-Dichloropropane         | 0.005                            | Affects lungs, liver and kidneys.   | Granular activated carbon.             |
| Epichlorohydrin             | TT                               | Affects kidneys, liver and lungs. Probable cause of cancer.                                 | Granular activated carbon.             |
| Ethylbenzene                | 0.7                              | Affects nervous system, liver and kidneys.  | Granular activated carbon.             |
| Ethylene dibromide (EDB)    | 0.00005                          | Probable cause of cancer.   | Granular activated carbon.             |
| Monochlorovenzene           | 0.1                              | Affects nervous system, kidneys and liver.  | Granular activated carbon.             |
| Styrene                     | 0.1                              | Affects nervous system, liver and kidneys.  | Granular activated carbon.             |
| Tetrachloroethylene (PCE)   | 0.005                            | Affects nervous system, Probable cause of cancer.   | Granular activated carbon.             |
| Toulene                     | 1.0                              | Affects nervous system, liver and kidneys. Causes narcosis. Irritant to respiratory system. | Granular activated carbon, iozonation. |
| 1,1,1-Trichloroethane       | 0.2                              | Affects nervous system. Causes narcosis and probably cancer.                                | Granular activated carbon.             |

**PRIMARY DRINKING WATER CONTAMINANTS – cont.**

| <u>Contaminants</u>   | <u>Maximum Contaminant Level<br/>mg/L</u> | <u>Health Effects</u>   | <u>Treatment</u>   |
|---|---|---|--|
| Trichloroethylene (TCE)   | 0.005                                     | Affects nervous system. Probable cause of cancer.   | Granular activated carbon.                                 |
| Total trihalomethanes (THMs)<br>Chloroform, Bromoform,<br>Bromodichloromethane,<br>Dibromochloromethane | 0.1                                       |   | Granular activated carbon, iozonation with UV irradiation. |
| Vinyl chloride  | 0.002                                     | Affects nervous system. Probable cause of cancer.   | Granular activated carbon.                                 |
| Xylenes (total)   | 10  | Affects nervous system, kidneys, lungs, liver and mucous membranes.   | Granular activated carbon.                                 |
| <b>PESTICIDES</b>   |   |   |  |
| Aldicarb  | 0.003                                     | Affects nervous system, respiratory system, liver and kidneys. Causes anemia, leukemia. Probable cause of cancer.                   | Granular activated carbon.                                 |
| Aldicarb Sulfone  | 0.002                                     |   |  |
| Aldicarb Sulfoxide  | 0.004                                     |   |  |
| Carbofuran  | 0.04                                      |   |  |
| Chlordane   | 0.002                                     |   |  |
| Endrin  | 0.002                                     |   |  |
| Heptachlor  | 0.0004                                    |   |  |
| Heptachlor epoxide  | 0.0002                                    |   |  |
| Lindane   | 0.0002                                    |   |  |
| Methoxychlor  | 0.04                                      |   |  |
| Toxaphene   | 0.003                                     |   |  |
| <b>HERBICIDES</b>   |   |   |  |
| Alachlor  | 0.002                                     | Affects nervous and reproductive system, respiratory system, liver, heart and kidneys. Causes anesthesia. Probable cause of cancer. | Granular activated carbon.                                 |
| Atrazine  | 0.003                                     |   |  |
| 2,4-D   | 0.07                                      |   |  |
| Pentachlorophenol   | 0.001                                     |   |  |
| 2,4,5-TP (Silvex)   | 0.05                                      |   |  |
| <b>MICROBIOLOGICAL</b>  |   |   |  |
| Total coliform  | < 1 colony/100mL                          | Affects digestive tract. Presence in water may indicate possible presence of other bacteria.  | Chlorination, UV irradiation, distillation.                |
| Giardia lamblia   | zero                                      | Stomach cramps, intestinal distress (Giardiasis)  | Filtration, chlorination, UV irradiation, distillation.    |
| Legionella  | zero                                      | Causes Legionnaires' disease, Pontiac fever.  | Filtration, Chlorination, UV irradiation.                  |

**PRIMARY DRINKING WARE CONTAMINANTS, cont.**

| <u>Contaminants</u>    | <u>Suggested Maximum Contaminant Level mg/L</u> | <u>Health Effects</u>  | <u>Treatment</u>   |
|------------------------|---|--|--|
| Turbidity              | 0.5 – 1.0 NTU                                   | Interferes with disinfection.  | Filtration, distillation, granular activated carbon, RO. |
| <b>RADIONUCLIDES</b>   |   |  |  |
| Alpha Emitters         | 15 pCi/L  | Probable cause of cancer. Affects skeletal tissue, bone sarcomas, head sarcomas. | RO, ion exchange, lime softening at a high pH.           |
| Beta-particle emitters | 4 mrem  | Probable cause of cancer. Affects skeletal tissue, bone sarcomas, head sarcomas. | RO, ion exchange, lime softening at a high pH.           |
| Radium 226 & 228       | 5 pCi/L   |  |  |

**SECONDARY DRINKING WATER CONTAMINANTS**

Health Effects

Treatment

Suggested Maximum  
Contaminant Level mg/L

|                              |               |   |  |
|------------------------------|---------------|---|--|
| Aluminum                     | 0.05 to 0.2   | Discoloration of water.   | Ion exchange, RO, distillation.                      |
| Chloride                     | 250           | Taste, corrosion of pipes, toxic to plants.                             | Ion exchange, RO, distillation.                      |
| Color                        | 15 TCU        | Aesthetic, staining.  | Filtration, granular activated carbon, chlorination. |
| Corrosivity                  | Non-corrosive | Aesthetic, can leach contaminants into water such as lead, copper, etc. | Neutralization filters.                              |
| Foaming Agents               | 0.5           | Aesthetic.  | Carbon filtration, distillation.                     |
| Iron                         | 0.3           | Taste, staining, scaling, discoloration of water.                       | Ion exchange, chlorination/filtration.               |
| Manganese                    | 0.05          | Taste, staining, scaling, discoloration of water.                       | Ion exchange, chlorination/filtration.               |
| Odor                         | 3 TON         | Aesthetic, if from H <sub>2</sub> S, may cause stains and be corrosive. | Chlorination, carbon filtration.                     |
| pH                           | 6.5 to 8.5    | Corrosivity of water, staining.   | Neutralization.                                      |
| Silver                       | 0.1           | Argyria (discoloration of skin).  | Ion exchange, RO, distillation.                      |
| Sulfate                      | 250           | Taste, laxative effects.  | Ion exchange, RO, distillation.                      |
| Total dissolved solids (TDS) | 500           | Taste, corrosivity, limits effectiveness of soap and detergents.        | RO, distillation.                                    |
| Zinc                         | 5.0           | Taste.  | Ion exchange, RO, distillation.                      |

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1 This information was taken from the EPA National Primary and Secondary Drinking Water Standards.

**ABBREVIATIONS**

|       |                              |
|-------|------------------------------|
| MFL   | million fiber per liter      |
| mg/L  | milligrams per liter         |
| mrem  | millirem per year            |
| NTU   | nephelometric turbidity unit |
| pCi/L | pico Curies per liter        |
| RO    | reverse osmosis              |
| TCU   | total color units            |
| TON   | total odor number            |
| TT    | treatment technique required |