# APPENDIX A: Regulated Contaminants with Primary Drinking Water Standards

Key

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| **Acronym** | **Definition** |
| AL | Regulatory Action Level |
| MCL | Maximum Contaminant Level |
| MCLG | Maximum Contaminant Level Goal |
| MFL | Million fibers per liter |
| MRDL | Maximum Residual Disinfectant Level |
| MRDLG | Maximum Residual Disinfectant Level Goal |
| Mrem/year | millirems per year (a measure of radiation absorbed by the body |
| N/A | Not applicable |
| NTU | Nephelometric Turbidity Units |
| PHG | Public Health Goal |
| pCi/L | picocuries per liter (a measure of radioactivity) |
| ppb | parts per billion, or micrograms per liter (µg/L) |
| ppq | ppq = parts per quadrillion, or picograms per liter (pg/L) |
| ppm | ppm = parts per million, or milligrams per liter (mg/L) |
| ppt | parts per trillion, or nanograms per liter (ng/L) |
| TT | Treatment Technique |

## Microbiological Contaminants

| **Contaminant (CCR units)** | **Traditional MCL** | **To convert for CCR, multiply by** | **MCL in CCR units** | **PHG (MCLG) in CCR units** | **Major sources in Drinking Water** | **Health Effects Language** |
| --- | --- | --- | --- | --- | --- | --- |
| Total Coliform Bacteria (state Total Coliform Rule)  **MCL: Systems that collect ≥40 samples/month:** 5.0% of monthly samples are positive;  **Systems that collect <40 samples/month:** 1 positive monthly sample |  |  |  | (0) | Naturally present in the environment | Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems. |
| Fecal Coliform and *E. coli* (state Total Coliform Rule)  MCL: A routine sample and a repeat sam­ple are total coliform positive, and one of these is also fecal coliform or *E. coli* positive |  |  |  | (0) | Human and animal fecal waste | Fecal coliforms and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. |
| Total Coliform Bacteria  (federal Revised Total Coliform Rule) | TT | N/A | TT | N/A | Naturally present in the environment | Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the drinking water distribution system. We found coliforms indicating the need to look for potential problems in water treatment or distribution. When this occurs, we are required to conduct assessment(s) to identify problems and to correct any problems that were found during these assessments. |
| *E. coli*  (federal Revised Total Coliform Rule) | Footnote[[1]](#footnote-1) | N/A | Footnote5 | (0) | Human and animal fecal waste | *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely-compromised immune systems.  *For the consumer confidence report, if a water system detects* E. coli *and has violated the* E. coli *MCL, the water system shall include the following statements, as appropriate.*   * We had an *E. coli*-positive repeat sample following a total coliform-positive routine sample. * We had a total coliform-positive repeat sample following an *E. coli*-positive routine sample. * We failed to take all required repeat samples following an *E. coli*-positive routine sample. * We failed to test for *E. coli* when any repeat sample tests positive for total coliform.   *If the E. coli MCL was not violated, the water system may include a statement that explains that although* E. coli *was detected, the water system is not in violation of the* E. coli *MCL*. |
| *E. coli*  (federal Revised Total Coliform Rule) | TT | N/A | TT | N/A | Human and animal fecal waste | *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, the elderly, and people with severely-compromised immune systems. |
| Fecal Indicator *E. coli* (Ground Water Rule) | 0 | N/A | 0 | (0) | Human and animal fecal waste | Fecal coliforms and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. |
| Fecal Indicators (enterococci or coliphage) (Ground Water Rule) | TT | N/A | TT | N/A | Human and animal fecal waste | Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. |
| Turbidity | TT | N/A | TT | N/A | Soil runoff | Turbidity has no health effects. However, high levels of turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches. |
| *Giardia lamblia,* Viruses, Heterotrophic Plate Count Bacteria, *Legionella, Cryptosporidium*  Surface water treatment = TT | TT | TT | TT | HPC = N/A; Others = (0) | Naturally present in the environment | Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches. |

## Radioactive Contaminants

| **Contaminant (CCR units)** | **Traditional MCL** | **To convert for CCR, multiply by** | **MCL in CCR units** | **PHG**  **(MCLG) in CCR units** | **Major Sources in Drinking Water** | **Health Effects Language** |
| --- | --- | --- | --- | --- | --- | --- |
| Gross Beta Particle Activity (pCi/L) | 50[[2]](#footnote-2) | N/A | 50 | (0) | Decay of natural and man-made deposits | Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer. |
| Strontium-90 (pCi/L) | 8 | N/A | 8 | 0.35 | Decay of natural and man-made deposits | Some people who drink water containing strontium-90 in excess of the MCL over many years may have an increased risk of getting cancer. |
| Tritium (pCi/L) | 20,000 | N/A | 20,000 | 400 | Decay of natural and man-made deposits | Some people who drink water containing tritium in excess of the MCL over many years may have an increased risk of getting cancer. |
| Gross Alpha Particle Activity (pCi/L) | 15 | N/A | 15 | (0) | Erosion of natural deposits | Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer. |
| Combined Radium (pCi/L) | 5 | N/A | 5 | (0)[[3]](#footnote-3) | Erosion of natural deposits | Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer. |
| Total Radium (pCi/L)  (for nontransient-noncommunity water systems) | 5 | N/A | 5 | N/A | Erosion of natural deposits | Some people who drink water containing radium 223, 224, or 226 in excess of the MCL over many years may have an increased risk of getting cancer. |
| Uranium (pCi/L) | 20 | N/A | 20 | 0.43 | Erosion of natural deposits | Some people who drink water containing uranium in excess of the MCL over many years may have kidney problems or an increased risk of getting cancer. |

## Inorganic Contaminants

| **Contaminant (CCR units)** | **Traditional MCL in mg/L** | **To convert for CCR, multiply by** | **MCL in CCR units** | **PHG**  **(MCLG) in CCR units** | **Major Sources in Drinking Water** | **Health Effects Language** |
| --- | --- | --- | --- | --- | --- | --- |
| Aluminum (mg/L) | 1 | - | 1 | 0.6 | Erosion of natural deposits; residue from some surface water treatment processes | Some people who drink water containing aluminum in excess of the MCL over many years may experience short-term gastrointestinal tract effects. |
| Antimony (µg/L) | 0.006 | 1,000 | 6 | 1 | Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder | Some people who drink water containing antimony in excess of the MCL over many years may experience increases in blood cholesterol and decreases in blood sugar. |
| Arsenic (µg/L) | 0.010 | 1,000 | 10 | 0.004 | Erosion of natural deposits; runoff from orchards; glass and electronics production wastes | Some people who drink water containing arsenic in excess of the MCL over many years may experience skin damage or circulatory system problems, and may have an increased risk of getting cancer. |
| Asbestos (MFL) | 7 MFL | - | 7 | 7 | Internal corrosion of asbestos cement water mains; erosion of natural deposits | Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps. |
| Barium (mg/L) | 1 | - | 1 | 2 | Discharges of oil drilling wastes and from metal refineries; erosion of natural deposits | Some people who drink water containing barium in excess of the MCL over many years may experience an increase in blood pressure. |
| Beryllium (µg/L) | 0.004 | 1,000 | 4 | 1 | Discharge from metal refineries, coal-burning factories, and electrical, aerospace, and defense industries | Some people who drink water containing beryllium in excess of the MCL over many years may develop intestinal lesions. |
| Cadmium (µg/L) | 0.005 | 1,000 | 5 | 0.04 | Internal corrosion of galvanized pipes; erosion of natural deposits; discharge from electroplating and industrial chemical factories, and metal refineries; runoff from waste batteries and paints | Some people who drink water containing cadmium in excess of the MCL over many years may experience kidney damage. |
| Chromium [Total] (µg/L) | 0.05 | 1,000 | 50 | (100) | Discharge from steel and pulp mills and chrome plating; erosion of natural deposits | Some people who use water containing chromium in excess of the MCL over many years may experience allergic dermatitis. |
| Copper (mg/L) | AL = 1.3 | - | AL = 1.3 | 0.3 | Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives | Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time may experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years may suffer liver or kidney damage. People with Wilson’s Disease should consult their personal doctor. |
| Cyanide (µg/L) | 0.15 | 1,000 | 150 | 150 | Discharge from steel/metal, plastic and fertilizer factories | Some people who drink water containing cyanide in excess of the MCL over many years may experience nerve damage or thyroid problems. |
| Fluoride (mg/L) | 2.0 | - | 2.0 | 1 | Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories | Some people who drink water containing fluoride in excess of the federal MCL of 4 mg/L over many years may get bone disease, including pain and tenderness of the bones. Children who drink water containing fluoride in excess of the state MCL of 2 mg/L may get mottled teeth. |
| Lead (µg/L) | AL = 0.015 | 1,000 | AL = 15 | 0.2 | Internal corrosion of household water plumbing systems; discharges from industrial manufacturers; erosion of natural deposits | Infants and children who drink water containing lead in excess of the action level may experience delays in their physical or mental development. Children may show slight deficits in attention span and learning abilities. Adults who drink this water over many years may develop kidney problems or high blood pressure. |
| Mercury [Inorganic] (µg/L) | 0.002 | 1,000 | 2 | 1.2 | Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and cropland | Some people who drink water containing mercury in excess of the MCL over many years may experience mental disturbances, or impaired physical coordination, speech and hearing. |
| Nickel (µg/L) | 0.1 | 1,000 | 100 | 12 | Erosion of natural deposits; discharge from metal factories | Some people who drink water containing nickel in excess of the MCL over many years may experience liver and heart effects. |
| Nitrate (mg/L) | 10 (as N) | - | 10 (as N) | 10 (as N) | Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits | Infants below the age of six months who drink water containing nitrate in excess of the MCL may quickly become seriously ill and, if untreated, may die because high nitrate levels can interfere with the capacity of the infant’s blood to carry oxygen. Symptoms include shortness of breath and blueness of the skin. High nitrate levels may also affect the oxygen-carrying ability of the blood of pregnant women. |
| Nitrite (mg/L) | 1 (as N) | - | 1 (as N) | 1 (as N) | Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits | Infants below the age of six months who drink water containing nitrite in excess of the MCL may quickly become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blueness of the skin. |
| Perchlorate (µg/L) | 0.006 | 1,000 | 6 | 1 | Perchlorate is an inorganic chemical used in solid rocket propellant, fireworks, explosives, flares, matches, and a variety of industries. It usually gets into drinking water as a result of environmental contamination from historic aerospace or other industrial operations that used or use, store, or dispose of perchlorate and its salts. | Perchlorate has been shown to interfere with uptake of iodide by the thyroid gland, and to thereby reduce the production of thyroid hormones, leading to adverse effects associated with inadequate hormone levels. Thyroid hormones are needed for normal prenatal growth and development of the fetus, as well as for normal growth and development in the infant and child. In adults, thyroid hormones are needed for normal metabolism and mental function. |
| Selenium (µg/L) | 0.05 | 1,000 | 50 | 30 | Discharge from petroleum, glass, and metal refineries; erosion of natural deposits; discharge from mines and chemical manufacturers; runoff from livestock lots (feed additive) | Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years may experience hair or fingernail losses, numbness in fingers or toes, or circulation system problems. |
| Thallium (µg/L) | 0.002 | 1,000 | 2 | 0.1 | Leaching from ore-processing sites; discharge from electronics, glass, and drug factories | Some people who drink water containing thallium in excess of the MCL over many years may experience hair loss, changes in their blood, or kidney, intestinal, or liver problems. |

## Synthetic Organic Contaminants including Pesticides and Herbicides

| **Contaminant (CCR units)** | **Traditional MCL in mg/L** | **To convert for CCR, multiply by** | **MCL in CCR units** | **PHG (MCLG) in CCR units** | **Major Sources in Drinking Water** | **Health Effects Language** |
| --- | --- | --- | --- | --- | --- | --- |
| 2,4-D (µg/L) | 0.07 | 1,000 | 70 | 20 | Runoff from herbicide used on row crops, range land, lawns, and aquatic weeds | Some people who use water containing the weed killer 2,4-D in excess of the MCL over many years may experience kidney, liver, or adrenal gland problems. |
| 2,4,5-TP [Silvex] (µg/L) | 0.05 | 1,000 | 50 | 3 | Residue of banned herbicide | Some people who drink water containing Silvex in excess of the MCL over many years may experience liver problems. |
| Acrylamide | TT | - | TT | (0) | Added to water during sewage/wastewater treatment | Some people who drink water containing high levels of acrylamide over a long period of time may experience nervous system or blood problems, and may have an increased risk of getting cancer. |
| Alachlor (µg/L) | 0.002 | 1,000 | 2 | 4 | Runoff from herbicide used on row crops | Some people who use water containing alachlor in excess of the MCL over many years may experience eye, liver, kidney, or spleen problems, or experience anemia, and may have an increased risk of getting cancer. |
| Atrazine (µg/L) | 0.001 | 1,000 | 1 | 0.15 | Runoff from herbicide used on row crops and along railroad and highway right-of-ways | Some people who use water containing atrazine in excess of the MCL over many years may experience cardiovascular system problems or reproductive difficulties. |
| Bentazon (µg/L) | 0.018 | 1,000 | 18 | 200 | Runoff/leaching from herbicide used on beans, peppers, corn, peanuts, rice, and ornamental grasses | Some people who drink water containing bentazon in excess of the MCL over many years may experience prostate and gastrointestinal effects. |
| Benzo(a)pyrene [PAH] (ng/L) | 0.0002 | 1,000,000 | 200 | 7 | Leaching from linings of water storage tanks and distribution mains | Some people who use water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer. |
| Carbofuran (µg/L) | 0.018 | 1,000 | 18 | 0.7 | Leaching of soil fumigant used on rice and alfalfa, and grape vineyards | Some people who use water containing carbofuran in excess of the MCL over many years may experience problems with their blood, or nervous or reproductive system problems. |
| Chlordane (ng/L) | 0.0001 | 1,000,000 | 100 | 30 | Residue of banned insecticide | Some people who use water containing chlordane in excess of the MCL over many years may experience liver or nervous system problems, and may have an increased risk of getting cancer. |
| Dalapon (µg/L) | 0.2 | 1,000 | 200 | 790 | Runoff from herbicide used on rights-of-way, and crops and landscape maintenance | Some people who drink water containing dalapon in excess of the MCL over many years may experience minor kidney changes. |
| Di(2-ethylhexyl) Adipate (µg/L) | 0.4 | 1,000 | 400 | 200 | Discharge from chemical factories | Some people who drink water containing di(2-ethylhexyl) adipate in excess of the MCL over many years may experience weight loss, liver enlargement, or possible reproductive difficulties. |
| Di(2-ethylhexyl) Phthalate (µg/L) | 0.004 | 1,000 | 4 | 12 | Discharge from rubber and chemical factories; inert ingredient in pesticides | Some people who use water containing di(2-ethylhexyl) phthalate well in excess of the MCL over many years may experience liver problems or reproductive difficulties, and may have an increased risk of getting cancer. |
| Dibromochloropropane [DBCP] (ng/L) | 0.0002 | 1,000,000 | 200 | 1.7 | Banned nematocide that may still be present in soils due to runoff/leaching from former use on soybeans, cotton, vineyards, tomatoes, and tree fruit | Some people who use water containing DBCP in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer. |
| Dinoseb (µg/L) | 0.007 | 1,000 | 7 | 14 | Runoff from herbicide used on soybeans, vegetables, and fruits | Some people who drink water containing dinoseb in excess of the MCL over many years may experience reproductive difficulties. |
| Dioxin [2,3,7,8-TCDD] (pg/L) | 0.00000003 | 1,000,000,000 | 30 | 0.05 | Emissions from waste incineration and other combustion; discharge from chemical factories | Some people who use water containing dioxin in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer. |
| Diquat (µg/L) | 0.02 | 1,000 | 20 | 6 | Runoff from herbicide use for terrestrial and aquatic weeds | Some people who drink water containing diquat in excess of the MCL over many years may get cataracts. |
| Endothall (µg/L) | 0.1 | 1,000 | 100 | 94 | Runoff from herbicide use for terrestrial and aquatic weeds; defoliant | Some people who drink water containing endothall in excess of the MCL over many years may experience stomach or intestinal problems. |
| Endrin (µg/L) | 0.002 | 1,000 | 2 | 0.3 | Residue of banned insecticide and rodenticide | Some people who drink water containing endrin in excess of the MCL over many years may experience liver problems. |
| Epichlorohydrin | TT | - | TT | (0) | Discharge from industrial chemical factories; impurity of some water treatment chemicals | Some people who drink water containing high levels of epichlorohydrin over a long period of time may experience stomach problems, and may have an increased risk of getting cancer. |
| Ethylene Dibromide [EDB] (ng/L) | 0.00005 | 1,000,000 | 50 | 10 | Discharge from petroleum refineries; underground gas tank leaks; banned nematocide that may still be present in soils due to runoff and leaching from grain and fruit crops | Some people who use water containing ethylene dibromide in excess of the MCL over many years may experience liver, stomach, reproductive system, or kidney problems, and may have an increased risk of getting cancer. |
| Glyphosate (µg/L) | 0.7 | 1,000 | 700 | 900 | Runoff from herbicide use | Some people who drink water containing glyphosate in excess of the MCL over many years may experience kidneys problems or reproductive difficulties. |
| Heptachlor (ng/L) | 0.00001 | 1,000,000 | 10 | 8 | Residue of banned insecticide | Some people who use water containing heptachlor in excess of the MCL over many years may experience liver damage and may have an increased risk of getting cancer. |
| Heptachlor Epoxide (ng/L) | 0.00001 | 1,000,000 | 10 | 6 | Breakdown of heptachlor | Some people who use water containing heptachlor epoxide in excess of the MCL over many years may experience liver damage, and may have an increased risk of getting cancer. |
| Hexachlorobenzene (µg/L) | 0.001 | 1,000 | 1 | 0.03 | Discharge from metal refineries and agricultural chemical factories; byproduct of chlorination reactions in wastewater | Some people who drink water containing hexachlorobenzene in excess of the MCL over many years may experience liver or kidney problems, or adverse reproductive effects, and may have an increased risk of getting cancer. |
| Hexachlorocyclo-pentadiene (µg/L) | 0.05 | 1,000 | 50 | 2 | Discharge from chemical factories | Some people who use water containing hexachlorocyclopentadiene in excess of the MCL over many years may experience kidney or stomach problems. |
| Lindane (ng/L) | 0.0002 | 1,000,000 | 200 | 32 | Runoff/leaching from insecticide used on cattle, lumber, and gardens | Some people who drink water containing lindane in excess of the MCL over many years may experience kidney or liver problems. |
| Methoxychlor (µg/L) | 0.03 | 1,000 | 30 | 0.09 | Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, and livestock | Some people who drink water containing methoxychlor in excess of the MCL over many years may experience reproductive difficulties. |
| Molinate [Ordram] (µg/L) | 0.02 | 1,000 | 20 | 1 | Runoff/leaching from herbicide used on rice | Some people who use water containing molinate in excess of the MCL over many years may experience reproductive effects. |
| Oxamyl [Vydate] (µg/L) | 0.05 | 1,000 | 50 | 26 | Runoff/leaching from insecticide used on field crops, fruits and ornamentals, especially apples, potatoes, and tomatoes | Some people who drink water containing oxamyl in excess of the MCL over many years may experience slight nervous system effects. |
| PCBs [Polychlorinated Biphenyls] (ng/L) | 0.0005 | 1,000,000 | 500 | 90 | Runoff from landfills; discharge of waste chemicals | Some people who drink water containing PCBs in excess of the MCL over many years may experience changes in their skin, thymus gland problems, immune deficiencies, or repro­ductive or nervous system difficulties, and may have an increased risk of getting cancer. |
| Pentachlorophenol (µg/L) | 0.001 | 1,000 | 1 | 0.3 | Discharge from wood preserving factories, cotton and other insecticidal/herbicidal uses | Some people who use water containing pentachlorophenol in excess of the MCL over many years may experience liver or kidney problems, and may have an increased risk of getting cancer. |
| Picloram (µg/L) | 0.5 | 1,000 | 500 | 166 | Herbicide runoff | Some people who drink water containing picloram in excess of the MCL over many years may experience liver problems. |
| Simazine (µg/L) | 0.004 | 1,000 | 4 | 4 | Herbicide runoff | Some people who use water containing simazine in excess of the MCL over many years may experience blood problems. |
| Thiobencarb (µg/L) | 0.07 | 1,000 | 70 | 42 | Runoff/leaching from herbicide used on rice | Some people who use water containing thiobencarb in excess of the MCL over many years may experience body weight and blood effects. |
| Toxaphene (µg/L) | 0.003 | 1,000 | 3 | 0.03 | Runoff/leaching from insecticide used on cotton and cattle | Some people who use water containing toxaphene in excess of the MCL over many years may experience kidney, liver, or thyroid problems, and may have an increased risk of getting cancer. |
| 1,2,3-Trichloropropane [TCP] (µg/L) | 0.000005 | 1,000 | 0.005 | 0.0007 | Discharge from industrial and agricultural chemical factories; leaching from hazardous waste sites; used as cleaning and maintenance solvent, paint and varnish remover, and cleaning and degreasing agent; byproduct during the production of other compounds and pesticides. | Some people who drink water containing 1,2,3-trichloropropane in excess of the MCL over many years may have an increased risk of getting cancer. |

## Volatile Organic Contaminants

| **Contaminant (CCR units)** | **Traditional MCL in mg/L** | **To convert for CCR, multiply by** | **MCL in CCR units** | **PHG**  **(MCLG) in CCR units** | **Major Sources in Drinking Water** | **Health Effects Language** |
| --- | --- | --- | --- | --- | --- | --- |
| Benzene (µg/L) | 0.001 | 1,000 | 1 | 0.15 | Discharge from plastics, dyes and nylon factories; leaching from gas storage tanks and landfills | Some people who use water containing benzene in excess of the MCL over many years may experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer. |
| Carbon Tetrachloride (ng/L) | 0.0005 | 1,000,000 | 500 | 100 | Discharge from chemical plants and other industrial activities | Some people who use water containing carbon tetrachloride in excess of the MCL over many years may experience liver problems and may have an increased risk of getting cancer. |
| 1,2-Dichlorobenzene (µg/L) | 0.6 | 1,000 | 600 | 600 | Discharge from industrial chemical factories | Some people who drink water containing 1,2-dichlorobenzene in excess of the MCL over many years may experience liver, kidney, or circulatory system problems. |
| 1,4-Dichlorobenzene (µg/L) | 0.005 | 1,000 | 5 | 6 | Discharge from industrial chemical factories | Some people who use water containing 1,4-dichlorobenzene in excess of the MCL over many years may experience anemia, liver, kidney, or spleen damage, or changes in their blood. |
| 1,1-Dichloroethane (µg/L) | 0.005 | 1,000 | 5 | 3 | Extraction and degreasing solvent; used in manufacture of pharmaceuticals, stone, clay and glass products; fumigant | Some people who use water containing 1,1-dichloroethane in excess of the MCL over many years may experience nervous system or respiratory problems. |
| 1,2-Dichloroethane (ng/L) | 0.0005 | 1,000,000 | 500 | 400 | Discharge from industrial chemical factories | Some people who use water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer. |
| 1,1-Dichloroethylene (µg/L) | 0.006 | 1,000 | 6 | 10 | Discharge from industrial chemical factories | Some people who use water containing 1,1-dichloroethylene in excess of the MCL over many years may experience liver problems. |
| cis-1,2-Dichloroethylene (µg/L) | 0.006 | 1,000 | 6 | 100 | Discharge from industrial chemical factories; major biodegradation byproduct of TCE and PCE groundwater contamination | Some people who use water containing cis-1,2-dichloroethylene in excess of the MCL over many years may experience liver problems. |
| trans-1,2-Dichloroethylene (µg/L) | 0.01 | 1,000 | 10 | 60 | Discharge from industrial chemical factories; minor biodegradation byproduct of TCE and PCE groundwater contamination | Some people who drink water containing trans-1,2-dichloroethylene in excess of the MCL over many years may experience liver problems. |
| Dichloromethane (µg/L) | 0.005 | 1,000 | 5 | 4 | Discharge from pharmaceutical and chemical factories; insecticide | Some people who drink water containing dichloromethane in excess of the MCL over many years may experience liver problems and may have an increased risk of getting cancer. |
| 1,2-Dichloropropane (µg/L) | 0.005 | 1,000 | 5 | 0.5 | Discharge from industrial chemical factories; primary component of some fumigants | Some people who use water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer. |
| 1,3-Dichloropropene (ng/L) | 0.0005 | 1,000,000 | 500 | 200 | Runoff/leaching from nematocide used on croplands | Some people who use water containing 1,3-dichloropropene in excess of the MCL over many years may have an increased risk of getting cancer. |
| Ethylbenzene (µg/L) | 0.3 | 1,000 | 300 | 300 | Discharge from petroleum refineries; industrial chemical factories | Some people who use water containing ethylbenzene in excess of the MCL over many years may experience liver or kidney problems. |
| Methyl-tert-butyl ether (µg/L) | 0.013 | 1,000 | 13 | 13 | Leaking underground storage tanks; discharge from petroleum and chemical factories | Some people who use water containing methyl-tert-butyl ether in excess of the MCL over many years may have an increased risk of getting cancer. |
| Monochlorobenzene (µg/L) | 0.07 | 1,000 | 70 | 70 | Discharge from industrial and agricultural chemical factories and dry cleaning facilities | Some people who use water containing monochlorobenzene in excess of the MCL over many years may experience liver or kidney problems. |
| Styrene (µg/L) | 0.1 | 1,000 | 100 | 0.5 | Discharge from rubber and plastic factories; leaching from landfills | Some people who drink water containing styrene in excess of the MCL over many years may experience liver, kidney, or circulatory system problems. |
| 1,1,2,2-Tetrachloroethane (µg/L) | 0.001 | 1,000 | 1 | 0.1 | Discharge from industrial and agricultural chemical factories; solvent used in production of TCE, pesticides, varnish and lacquers | Some people who drink water containing 1,1,2,2-tetrachloroethane in excess of the MCL over many years may experience liver or nervous system problems. |
| Tetrachloroethylene (PCE) (µg/L) | 0.005 | 1,000 | 5 | 0.06 | Discharge from factories, dry cleaners, and auto shops (metal degreaser) | Some people who use water containing tetrachloroethylene in excess of the MCL over many years may experience liver problems, and may have an increased risk of getting cancer. |
| 1,2,4-Trichlorobenzene (µg/L) | 0.005 | 1,000 | 5 | 5 | Discharge from textile-finishing factories | Some people who use water containing 1,2,4-trichlorobenzene in excess of the MCL over many years may experience adrenal gland changes. |
| 1,1,1-Trichloroethane (µg/L) | 0.200 | 1,000 | 200 | 1000 | Discharge from metal degreasing sites and other factories; manufacture of food wrappings | Some people who use water containing 1,1,1-trichloroethane in excess of the MCL over many years may experience liver, nervous system, or circulatory system problems. |
| 1,1,2-Trichloroethane (µg/L) | 0.005 | 1,000 | 5 | 0.3 | Discharge from industrial chemical factories | Some people who use water containing 1,1,2-trichloroethane in excess of the MCL over many years may experience liver, kidney or immune system problems. |
| Trichloroethylene [TCE] (µg/L) | 0.005 | 1,000 | 5 | 1.7 | Discharge from metal degreasing sites and other factories | Some people who use water containing trichloroethylene in excess of the MCL over many years may experience liver problems and may have an increased risk of getting cancer. |
| Toluene (µg/L) | 0.15 | 1,000 | 150 | 150 | Discharge from petroleum and chemical factories; underground gas tank leaks | Some people who use water containing toluene in excess of the MCL over many years may experience nervous system, kidney, or liver problems. |
| Trichlorofluoromethane (µg/L) | 0.15 | 1,000 | 150 | 1300 | Discharge from industrial factories; degreasing solvent; propellant and refrigerant | Some people who use water containing trichlorofluoromethane in excess of the MCL over many years may experience liver problems. |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (mg/L) | 1.2 | - | 1.2 | 4 | Discharge from metal degreasing sites and other factories; dry-cleaning solvent; refrigerant | Some people who use water containing 1,1,2-trichloro-1,2,2-trifluoroethane in excess of the MCL over many years may experience liver problems. |
| Vinyl Chloride (ng/L) | 0.0005 | 1,000,000 | 500 | 50 | Leaching from PVC piping; discharge from plastics factories; biodegradation byproduct of TCE and PCE groundwater contamination | Some people who use water containing vinyl chloride in excess of the MCL over many years may have an increased risk of get­ting cancer. |
| Xylenes (mg/L) | 1.750 | - | 1.750 | 1.8 | Discharge from petroleum and chemical factories; fuel solvent | Some people who use water containing xylenes in excess of the MCL over many years may experience nervous system damage. |

## Disinfection Byproducts, Disinfectant Residuals, and Disinfection Byproduct Precursors

| **Contaminant (CCR units)** | **Traditional MCL or [MRDL] in mg/L** | **To convert for CCR, multiply by** | **MCL or [MRDL]in CCR units** | **PHG, (MCLG or MRDLG]** | **Major Sources in Drinking Water** | **Health Effects Language** |
| --- | --- | --- | --- | --- | --- | --- |
| TTHMs [Total Trihalomethanes] (µg/L) | 0.080 | 1,000 | 80 | N/A | Byproduct of drinking water disinfection | Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience liver, kidney, or central nervous system problems, and may have an increased risk of getting cancer. |
| HAA5 [Sum of 5 Haloacetic Acids] (µg/L) | 0.060 | 1,000 | 60 | N/A | Byproduct of drinking water disinfection | Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer. |
| Bromate (µg/L) | 0.010 | 1,000 | 10 | 0.1 | Byproduct of drinking water disinfection | Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer. |
| Chloramines (mg/L) | [MRDL = 4.0 (as Cl2)] | - | [MRDL = 4.0 (as Cl2)] | [MRDLG = 4 (as Cl2)] | Drinking water disinfectant added for treatment | Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia. |
| Chlorine (mg/L) | [MRDL = 4.0 (as Cl2)] | - | [MRDL = 4.0 (as Cl2)] | [MRDLG = 4 (as Cl2)] | Drinking water disinfectant added for treatment | Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort. |
| Chlorite (mg/L) | 1.0 | - | 1.0 | 0.05 | Byproduct of drinking water disinfection | Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia. |
| Chlorine Dioxide (µg/L) | [MRDL = 0.8 (as ClO2)] | 1,000 | [MRDL = 800 (as ClO2)] | [MRDLG = 800 (as ClO2)] | Drinking water disinfectant added for treatment | Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. |
| Control of DBP Precursors (TOC) | TT | - | TT | N/A | Various natural and manmade sources | Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of cancer. |

1. Routine and repeat samples are total coliform-positive and either is *E. coli*-positive or system fails to take repeat samples following *E. coli*-positive routine sample or system fails to analyze total coliform-positive repeat sample for *E. coli*. [↑](#footnote-ref-1)
2. Effective June 11, 2006, the gross beta particle activity MCL is 4 millirem/year annual dose equivalent to the total body or any internal organ. 50 pCi/L is used as a screening level. [↑](#footnote-ref-2)
3. If reporting results for Ra-226 and Ra-228 as individual constituents, the PHG is 0.05 pCi/L for Ra-226 and 0.019 pCi/L for Ra-228. [↑](#footnote-ref-3)