

Volatile Organic Compounds (VOC)

Volatile Organic Compounds (VOCs) refers to a very broad category of chemicals, found in many forms in the environment, including both human-made and naturally occurring chemical compounds. VOCs are most often referred to in the context of chemicals that have the potential to affect the environment or human health. Consequently, VOCs are defined in different ways under different environmental, health and safety regulations.

It is possible for individual VOCs to reach levels of concern in drinking water. There are currently 23 compounds regulated as VOCs in drinking water. Of these, eight are described as **human carcinogens**, or probable or possible carcinogens.

The potential for VOCs to be a health concern depends on the toxicity, the concentration, the exposure conditions and the duration or exposure. Factors like age, health condition, gender and exposure to other chemicals can impact potential health effects for individuals. If ingested above certain levels, various VOCs have been found to cause **cancer, problems in the liver, kidneys and nervous system, and skin and reproductive issues**.

Acrylamid: Maximum Contaminant Level = 0.05% dosed at 1 mg/L (or equivalent)

Acrylamide is a chemical used mainly in certain industrial processes, such as in making paper, dyes, and plastics, and in treating drinking water and wastewater. There are small amounts in some consumer products, such as caulk, food packaging, and some adhesives. It is also found in cigarette smoke. Acrylamide can form in some starchy foods during high-temperature cooking, such as frying, roasting, and baking. Acrylamide forms from sugars and an amino acid that are naturally in food; it does not come from food packaging or exist separately in the environment.

During manufacturing of the acrylamide based polymeric coagulant aids, a small amount of residual acrylamide may remain in the coagulant as an impurity. When these coagulant are used in water treatment, there is a potential for residual acrylamide to be introduced in water. Drinking water may also contain acrylamide due to raw water contamination from other uses of acrylamide and because of leaching from acrylamide based components and materials used in water treatment, storage and distribution.

Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their **nervous system** and may have an **increased risk of getting cancer**.

Symptoms include:

- **Muscle weakness**
- **Numbness in hands and feet**
- **Sweating**
- **Unsteadiness**
- **Clumsiness**

Alachlor: Maximum Contaminant Level = 0.002 mg/L

Alachlor is an odorless white solid herbicide derived from aniline and used to control grasses and broadleaved weeds among crop plants. It is the second most used herbicide in the United States, and is commonly used in the treatment of corn, sorghum and soybeans. It is easier for alachlor to enter groundwater in areas with coarse soils and groundwater nearer to the land surface. Alachlor can also easily travel into surface water through runoff and streams. At high doses, Alachlor is considered a **carcinogen** in humans. Symptoms of acute exposure include:

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|--|---|
| <ul style="list-style-type: none">• Nausea• Vomiting• Abdominal Pain• Diarrhea• Confusion/Agitation• Dizziness & Drowsiness | <ul style="list-style-type: none">• Weakness• Hypertension• Bradycardia• Tachyarrhythmia*• Chest tightness• Eye Irritation |
|--|---|

- **Mydriasis, Miosis ****
- **Diaphoresis**
- **Fever**
- **Rhabdomyolysis*****
- **Hyponatremia ******
- **Incontinence**
- **Hematuria/Proteinuria*******
- **Abnormal Liver Enzymes**
- **Leukocytosis*******
- **Contact Dermatitis**

* A heart rate that exceeds the normal resting rate.

**Excessive contraction/dilation of the pupils

***A breakdown of muscle tissue that releases a damaging protein into the blood.

****A condition that occurs when the level of sodium in the blood is too low.

*****Steady or intermittent loss of small amounts of protein and blood in the urine

*****White cells (the leukocyte count) above the normal range in the blood.

Atrazine: Maximum Contaminant Level = 0.002 mg/L

Atrazine is a white, crystalline solid organic compound that functions as a photosynthesis-inhibiting herbicide used especially to kill annual weeds and quack grass. Atrazine is used to prevent pre- and post-emergence broadleaf weeds in crops such as corn, sugarcane and on turf, such as golf courses and residential lawns. It is one of the most widely used herbicides in US agriculture.

As of 2001, Atrazine was the most commonly detected pesticide contaminating drinking water in the United States. People who drink water containing Atrazine in excess of the maximum contaminant level (MCL) for many years may experience **problems with their cardiovascular system and reproductive difficulties**. Symptoms of Atrazine exposure include:

- **Abdominal pain**
- **Diarrhea**
- **Vomiting**
- **Eye Irritation**
- **Mucousa Irritation**
- **Depression**
- **Slowed Breathing**
- **Loss of Coordination**
- **Muscle Spasms**
- **Hypothermia**
- **Muscular Weakness**
- **Hypoactivity**
- **Breathing Difficulty**
- **Prostration**
- **Convulsions**

Benzene: Maximum Contaminant Level = 0.005 mg/L

Benzene is a clear, colorless aromatic liquid that is highly flammable. It is formed through natural processes, such as volcanoes and forest fires. It is also formed from industrial processes. Benzene is also a natural part of crude oil, gasoline and cigarette smoke. Benzene is most commonly used as a building block for making plastics, rubber, resins and synthetic fabrics like nylon and polyester. Other uses include: as a solvent in printing, paints, and dry cleaning chemicals.

The major sources of benzene in drinking water are discharge from factories; and leaching from gas storage tanks and landfills. Some people who drink water containing benzene in excess of the maximum contaminant level may experience **anemia** or a decrease in blood platelets, and may have an **increased risk of getting cancer**. Drinking water containing high levels of benzene can cause a variety of symptoms, including:

- **Vomiting**
- **Irritation of the stomach**
- **Dizziness**
- **Sleepiness**
- **Convulsions**
- **Rapid or irregular heartbeat**
- **Death (at very high levels)**

Benzo(a)pyrene (BaP): Maximum Contaminant Level = 0.0002 mg/L

Benzo(a)pyrene is a yellow crystalline amide member of a class of compounds known as polycyclic aromatic hydrocarbons. It is **a highly carcinogenic** isomer mixture that is formed especially in the burning of cigarettes, coal, and gasoline. In nature, BaP can appear as a result of volcanic eruptions and forest fires. Benzo(a)pyrene is not produced or used commercially but is very commonly found in the environment since it is formed as a result of incomplete combustion of organic materials.

Benzo(a)pyrene can be found in surface water, tap water, rainwater, groundwater, wastewater and sewage sludge. Evidence exists showing exposure can cause **skin, lung, and bladder cancer in humans and in animals**. If benzo(a)pyrene is on your skin when you are being exposed to sunlight or ultraviolet light, **the risk of skin cancer is greater**. Some people who drink water containing benzo(a)pyrene in excess of the maximum contaminant level may experience **reproductive difficulties** in addition to an increased risk of cancer. Symptoms of BaP exposure include:

- **Skin Rash**
- **Eye Irritation (redness, burning)**
- **Warts**
- **Bronchitis**

Carbofuran: Maximum Contaminant Level = 0.04 mg/L

Carbofuran is a highly toxic broad-spectrum carbamate pesticide commonly used on crops. It is a white crystalline solid with a slightly phenolic odor. The major source of carbofuran in drinking water is leaching of soil fumigant used on rice and alfalfa.

Some people who drink water containing carbofuran in excess of the maximum contaminant level may experience **problems with their blood or nervous or reproductive systems**. Symptoms of **carbofuran poisoning** include:

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| <ul style="list-style-type: none"> • Nausea • Vomiting • Abdominal Cramps • Sweating • Diarrhea • Excessive Salivation | <ul style="list-style-type: none"> • Weakness • Imbalance • Blurred Vision • Breathing Difficulty, • Hypertension • Incontinence |
|--|--|

Carbon Tetrachloride: Maximum Contaminant Level = 0.005 mg/L

Carbon Tetrachloride is a colorless, nonflammable, vaporous, toxic liquid. It is usually produced by the reaction of chlorine with carbon disulfide, methane and other carbon-containing compounds. Carbon Tetrachloride is primarily used as a refrigerant, fire extinguisher, cleaning fluid, solvent for rubber cement and insecticide.

The major sources of carbon tetrochloride in drinking water are discharge from chemical plants and other industrial activities. Acute oral exposures to high levels of carbon tetrachloride have been observed to cause **damage to the liver** (swollen, tender liver, changes in enzyme levels, and jaundice) and **kidneys** (nephritis, nephrosis, proteinuria). **Depression of the central nervous system** has also been reported. Symptoms of acute exposure of Carbon Tetrachloride include:

- **Weakness**
- **Lethargy**
- **Nausea**
- **Vomiting**

Chlordane: Maximum Contaminant Level = 0.002 mg/L

Chlordane is a viscous volatile toxic liquid insecticide formerly used in the U.S. It is a synthetic organic chemical that registers from colorless to amber, with a slight chlorine-like aromatic odor. Chlordane was used in the past to kill a variety of insects. The only commercial use of chlordane products still permitted is for fire ant control in power transformers.

Chlordane has been released into the environment primarily from its application as an insecticide. Chlordane may persist for long periods of time in air, soil and water. Some people who drink water containing chlordane in excess of the maximum contaminant level may experience **liver or nervous system problems; increased risk of cancer**. Symptoms of chlordane poisoning include:

- **Headache**
- **Nausea**
- **Excitability**
- **Confusion**
- **Muscle Tremors**
- **Convulsions**

Chlorobenzene: Maximum Contaminant Level = 0.1 mg/L

Chlorobenzene is a colorless, volatile, flammable, insoluble liquid with an almond-like odor and is made from chlorine and benzene. Chlorobenzene is also used in the manufacture of organic chemicals, dyes and insecticides. It is also used as a solvent for adhesives, drugs, rubber, paints and dry cleaning, and as a fiber-swelling agents in textile processing. The major source of chlorobenzene in drinking water is discharge from chemical and agricultural chemical factories. Some people who drink water containing chlorobenzene in excess of the maximum contaminant level may experience **problems with their liver or kidneys**. Symptoms of Chlorobenzene exposure can include:

- **Headaches**
- **Numbness**
- **Chronic Fatigue**
- **Nausea**
- **Vomiting**

2,4-Dichlorophenoxyacetic Acid (2,4-D): Maximum Contaminant Level = 0.07 mg/L

2,4-D is a colorless, odorless organic powder compound. It is most commonly used as an herbicide and plant growth regulator. 2,4-D is a systemic herbicide which selectively kills most broadleaf weeds by causing uncontrolled growth in them, but leaves most grasses such as cereals, lawn turf, and grassland relatively unaffected. The major source of 2,4-D in drinking water is runoff from herbicide used on row crops.

Some people who drink water containing 2,4-D (2,4-Dichlorophenoxyacetic Acid) excess of the maximum contaminant level may experience **problems with their kidneys, liver, or adrenal glands**. Symptoms of 2,4-D exposure include:

- **Appetite Loss**
- **Arm and Leg stiffness**
- **Burning in throat/chest**
- **Coma**
- **Coordination Loss**
- **Drowsiness**
- **Skin Rash**
- **Vomiting**

Dalapon: Maximum Contaminant Level = 0.2 mg/L

Dalapon is an herbicide used to control grasses in a wide variety of crops, including fruit trees, beans, coffee, corn, cotton and peas. It is also registered for use in a number of non-crop applications such as lawns, drainage ditches, along railroad tracks, and in industrial areas. The major source of dalapon in drinking water is runoff from herbicide used on rights of way.

Some people who drink water containing dalapon in excess may experience **problems with their kidneys and central nervous system**. Symptoms of dalapon exposure include:

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|---|---|
| <ul style="list-style-type: none">• Eye Irritation• Bradycardia*• Vomiting• Diarrhea | <ul style="list-style-type: none">• Loss of Appetite• Fatigue• Upper Respiratory Irritation• Skin Irritation |
|---|---|

*A slower than normal heart rate

1,2-Dibromo-3-chloropropane (DBCP): Maximum Contaminant Level = 0.0002 mg/L

DBCP is a dense yellow organic liquid with a pungent odor. It is used primarily as an unclassified nematocide for soil fumigation of cucumbers, summer squash, cabbage, cauliflower, carrots, snap beans, okra, aster, shasta daisy, lawn grasses and ornamental shrubs. The major source of 1,2-dibromo-3-chloropropane in drinking water is runoff/leaching from soil fumigant used on soybeans, cotton, pineapples and orchards.

Some people who drink water containing 1,2-dibromo-3-chloropropane in excess of the maximum contaminant level may experience **reproductive difficulties, liver damage, central nervous system impairment and may lead to an increased risk of getting cancer**. Symptoms of DBCP exposure include:

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|--|--|
| <ul style="list-style-type: none">▪ Nausea▪ Dizziness▪ Vomiting▪ Drowsiness | <ul style="list-style-type: none">▪ Tremors▪ Double Vision▪ Chronic Fatigue▪ Pulmonary Edema* |
|--|--|

* A condition caused by excess fluid in the lungs.

o-Dichlorobenzene: Maximum Contaminant Level = 0.6 mg/L

o-Dichlorobenzene is a colorless organic liquid with a pleasant, aromatic odor. o-Dichlorobenzene is most commonly used as a chemical intermediate for making agricultural chemicals, primarily herbicides. Other present and past uses include: solvent for waxes, gums, resins, wood preservatives, paints; insecticide for termites and borers; in making dyes; as a coolant, deodorizer, and de-greaser. The most common source of o-dichlorobenzene in drinking water is discharge from industrial chemical factories.

Some people who drink water containing o-dichlorobenzene in excess of the maximum contaminant level may experience **problems with their liver, kidneys, or circulatory systems**. Symptoms of exposure to o-Dichlorobenzene include:

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|--|---|
| <ul style="list-style-type: none">• Cough• Drowsiness• Sore Throat• Unconsciousness• Dry Skin/Rash | <ul style="list-style-type: none">• Esophageal Burning• Diarrhea• Nausea• Vomiting |
|--|---|

p-Dichlorobenzene: Maximum Contaminant Level = 0.075 mg/L

p-Dichlorobenzene is a synthetic, white crystalline solid that is practically insoluble in water and soluble in ether, chloroform, carbon disulfide, benzene, alcohol and acetone. It is used primarily as a space deodorant in products such as room deodorizers, urinal and toilet bowl blocks, and as an insecticide fumigant for moth control. The major source of p-dichlorobenzene in drinking water is discharge from industrial chemical factories.

Some people who drink water containing p-dichlorobenzene in excess of the maximum contaminant level may **experience anemia; damage to their liver, kidneys or spleen, changes in their blood, and a possible increase in the likelihood of cancer.** Symptoms of p-Dichlorobenzene exposure include:

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|----------------------|-----------------------|
| • Eye irritation | • Jaundice*** |
| • Swollen/Puffy Eyes | • Cirrhosis**** |
| • Chronic Rhinitis* | • Burning sensation |
| • Headache | • Drowsiness |
| • Nausea | • Cough |
| • Vomiting | • Shortness of breath |
| • Weight Loss | • Diarrhea |
| • Hemolytic Anemia** | |

* Irritation and swelling of the mucous membrane in the nose.

** A condition in which red blood cells are destroyed and removed from the bloodstream before their normal lifespan is over.

*** A condition with yellowing of the skin or whites of the eyes caused by obstruction of the bile duct

**** Chronic liver damage from a variety of causes leading to scarring and liver failure.

1,2-Dichloroethane: Maximum Contaminant Level = 0.005 mg/L

1,2-Dichloroethane is a chlorinated hydrocarbon. It is a colorless liquid with a chloroform-like odor. The most common use of 1,2-dichloroethane is in the production of vinyl chloride, which is used to make polyvinyl chloride (PVC) pipes, furniture and automobile upholstery, wall coverings, house wares, and automobile parts. Other uses include: as a solvent for resins and fats, photography, photocopying, cosmetics, pharmaceuticals, and as a fumigant for grains and orchards. The major source of 1,2-dichloroethane in drinking water is discharge from industrial chemical factories.

Some people who drink water containing 1,2-dichloroethane in excess of the maximum contaminant level may lead to **problems with their central nervous system, kidney damage, renal damage and lead to increased risk of getting cancer.** Symptoms of exposure to 1,2-Dichloroethane include:

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|------------|----------------------|
| ▪ Nausea | ▪ Lightheadedness |
| ▪ Vomiting | ▪ Dysequilibrium* |
| ▪ Headache | ▪ Coma |
| | ▪ Respiratory Arrest |

* A non-progressive cerebellar disorder characterized by an intellectual disability, delayed ambulation and cerebellar hypoplasia.

1,1-Dichloroethylene: Maximum Contaminant Level = 0.007 mg/L

1,1-Dichloroethylene is an industrial chemical that is not found naturally in the environment. It is a colorless liquid with a mild, sweet smell. It is also called vinylidene chloride. 1, 1-Dichloroethene is used to make certain plastics, such as flexible films like food wrap, and in packaging materials. It is also used to make flame retardant coatings for fiber and carpet backings, and in piping, coating for steel pipes, and in adhesive applications. The major source of 1,1-dichloroethylene in drinking water is discharge from industrial chemical factories.

Some people who drink water containing 1,1-dichloroethylene in excess of the maximum contaminant level may experience **problems with their liver and central nervous system**. The National Institute for Occupational Safety and Health considers 1,1-dichloroethene a **possible carcinogen**. Symptoms of 1,1-dichloroethylene exposure include:

- Sedation
- Inebriation
- Convulsions
- Spasms
- Unconsciousness

cis-1,2-Dichloroethylene: Maximum Contaminant Level = 0.07 mg/L

cis-1,2-Dichloroethylene is a highly flammable, colorless liquid with a sharp, harsh odor. It is used to produce solvents and in chemical mixtures. You can smell very small amounts of cis-1,2-dichloroethylene in. There are two forms of 1,2-dichloroethylene; one is called cis-1, 2-dichloroethylene and the other is called trans-1,2-di-chloroethylene. Sometimes both forms are present as a mixture. It is commonly used as solvent for waxes and resins; in the extraction of rubber; as a refrigerant; in the manufacture of pharmaceuticals and artificial pearls; in the extraction of oils and fats from fish and meat; and in making other organics. The major source of cis-1,2-dichloroethylene in drinking water is discharge from industrial chemical factories.

Some people who drink water containing cis-1,2-dichloroethylene in excess of the maximum contaminant level for a prolonged period may experience **problems with their liver**. Symptoms of cis-1,2-dichloroethylene exposure include:

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|---|---|
| <ul style="list-style-type: none">• Cough• Sore throat• Dizziness• Nausea• Drowsiness | <ul style="list-style-type: none">• Weakness• Unconsciousness• Vomiting• Dry Skin• Abdominal Pain |
|---|---|

trans-1,2-Dichloroethylene: Maximum Contaminant Level = 0.1 mg/L

trans-1,2-Dichloroethylene is a highly flammable, colorless liquid with a sharp, harsh odor. It is used to produce solvents and in chemical mixtures. You can smell very small amounts of 1, 2-dichloroethylene in. There are two forms of 1, 2-dichloroethene; one is called cis-1, 2-dichloroethylene and the other is called trans-1,2-di-chloroethylene. Sometimes both forms are present as a mixture. It is commonly used as solvent for waxes and resins; in the extraction of rubber; as a refrigerant; in the manufacture of pharmaceuticals and artificial pearls; in the extraction of oils and fats from fish and meat; and in making other organics. The major source of cis-1,2-dichloroethylene in drinking water is discharge from industrial chemical factories.

Some people who drink water containing cis-1,2-dichloroethylene in excess of the maximum contaminant level for a prolonged period may experience **problems with their liver**. Symptoms of trans-1,2-dichloroethylene exposure include:

- Cough
- Sore throat
- Dizziness
- Nausea
- Drowsiness
- Weakness
- Unconsciousness
- Vomiting
- Dry Skin
- Abdominal Pain

Dichloromethane: Maximum Contaminant Level = 0.005 mg/L

Dichloromethane is a clear, colorless, nonflammable, volatile liquid chlorinated hydrocarbon with a sweet, pleasant smell that emits highly toxic fumes when heated to decomposition. Dichloromethane is primarily used as a solvent in paint removers, but is also used in aerosol formulations, as a solvent in the manufacture of pharmaceuticals, as a degreasing agent, in electronics manufacturing and as an ethane foam-blown agent. Other uses include in: textiles, metals and plastics, pesticide industries; fumigant for strawberries and grains, and as de-greener for citrus fruits as an anesthetic; in extraction of caffeine, cocoa, fats, spices and beer hops, and as a heat transfer agent in refrigeration products.

The major source of dichloromethane in drinking water is discharge from drug and chemical companies. Some people who drink water containing dichloromethane in excess of the maximum contaminant level may experience **problems with their liver and may have an increased risk of getting cancer**. Symptoms of Dichloromethane exposure include:

- Difficulty Concentrating
- Dizziness
- Fatigue
- Headaches
- Nausea
- Numbness
- Respiratory Irritation
- Eye Irritation

1,2-Dichloropropane: Maximum Contaminant Level = 0.005 mg/L

1,2-Dichloropropane is a colorless flammable liquid with a chloroform-like odor. It does not occur naturally in the environment. It is used to make other organic chemicals. It is also used in making lead free gasoline, paper coating, soil fumigant for nematodes, and insecticide for stored grain. The major source of 1,2-dichloropropane in drinking water is discharge from industrial chemical factories. It may be released into the atmosphere or in wastewater during its production or use as an intermediate in chemical manufacture. There were also significant releases during its former use as a soil fumigant. It may also leach from municipal landfills.

Some people who drink water containing 1,2-dichloropropane in excess of the maximum contaminant level may have an **increased risk of getting cancer**. Symptoms of 1,2-Dichloropropane exposure include:

- Nausea
- Headache
- Drowsiness
- Abdominal pain
- Vomiting
- Diarrhea

Di(2-ethylhexyl) adipate: Maximum Contaminant Level = 0.4 mg/L

Di(2-ethylhexyl) adipate is manufactured light-colored oily chemical that is commonly added to plastics to make them flexible. It is also used as a solvent; in aircraft lubricants; as a hydraulic fluid; as a

plasticizer or solvent in the following cosmetics: bath oils, eye shadow, cologne, foundations, rouge, blusher, nail polish remover, moisturizers and indoor tanning preparations; and in meat wrapping operations. The major source of di(2-ethylhexyl) adipate in drinking water is discharge from chemical factories.

Some people who drink water containing di(2-ethylhexyl) adipate in excess of the maximum contaminant level may experience toxic effects such as **weight loss, liver enlargement, or possible reproductive difficulties**. Symptoms of Di(2-ethylhexyl) adipate exposure include:

▪ **Nausea**

▪ **Diarrhea**

Di(2-ethylhexyl) phthalate: Maximum Contaminant Level = 0.006 mg/L

Di(2-ethylhexyl) phthalate is the most commonly used of a group of related chemicals called phthalates or phthalic acid esters. The greatest use of di(2-ethylhexyl) phthalate is as a plasticizer for polyvinylchloride (PVC) and other polymers including rubber, cellulose and styrene. A number of packaging materials and tubing used in the production of foods and beverages are polyvinylchloride contaminated with phthalic acid esters, primarily di(2-ethylhexyl) phthalate. The major source of di(2-ethylhexyl) phthalate in drinking water is discharge from rubber and chemical factories.

Some people who drink water containing di(2-ethylhexyl) phthalate in excess of the maximum contaminant level may have **problems with their liver, or may experience reproductive difficulties and may have an increased risk of getting cancer**. Symptoms of di(2-ethylhexyl) phthalate exposure include:

- **Abdominal Cramps**
- **Diarrhea**
- **Nausea**
- **Mucous Membrane Irritation**

Dinoseb: Maximum Contaminant Level = 0.007 mg/L

Dinoseb is a pungent orange-brown viscous liquid or orange-brown solid. Its most commonly used as a contact herbicide for post-emergence weed control in cereals, under sown cereals, lucerne seedlings and peas. Dinoseb is also used as a corn enhancer and an insecticide and miticide. The major source of dinoseb in drinking water is runoff from herbicide used on soybeans and vegetables. Some people who drink water containing dinoseb in excess of the maximum contaminant level may experience **reproductive difficulties**. Symptoms of Dinoseb exposure include:

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| <ul style="list-style-type: none">• Abdominal Pain• Sweating• Headache• Labored Breathing• Nausea | <ul style="list-style-type: none">• Vomiting• Fever• Convulsions• Unconsciousness• Cyanosis* |
|--|---|

* *A bluish discoloration of the skin resulting from poor circulation or inadequate oxygenation of the blood.*

Dioxin (2,3,7,8-TCDD:) Maximum Contaminant Level = 0.00000003 mg/L

Dioxin is an organic solid of white crystalline needles. Dioxin is not produced or used commercially in the United States. It is a contaminant formed in the production of some chlorinated organic compounds, including a few herbicides such as silvex. It may also be formed during combustion of a variety of chlorinated organic compounds, including a few herbicides such as silvex. The major sources of dioxin in drinking water are emissions from waste incineration and other combustion; and discharge from chemical factories.

Some people who drink water containing dioxin in excess of the maximum contaminant level may experience **reproductive difficulties** and may have an **increased risk of getting cancer**. Symptoms of dioxin exposure include:

- **Chloracne***
- **Redness and Swelling of the Skin/Eyes**

*An acne-like eruption of blackheads, cysts, and pustules. Lesions are most frequently found on the cheeks, behind the ears, in the armpits and groin region.

Diquat: Maximum Contaminant Level = 0.02 mg/L

Diquat is an organic solid of colorless or yellow crystals. Diquat is a herbicide that has been used extensively in the United States since the late 1950s to control both crop and aquatic weeds. It is used on potatoes; as an aid in harvesting cotton, rapeseed and other oil seed crops; to wilt and dry out silage, standing hay, etc., for storage. It's also used as a plant growth regulator and sugar cane-flowering suppressant. The major source of diquat in drinking water is runoff from herbicide use.

Some people who drink water containing diquat in excess of the maximum contaminant level may experience in an increase in frequency of **cataracts**.

Endothall: Maximum Contaminant Level = 0.1 mg/L

Endothall is an organic solid of white odorless crystals. Endothall is used as a defoliant for a wide range of crops and as a herbicide for both terrestrial and aquatic weeds. It is used as a desiccant on lucerne and on potato, for the defoliation of cotton, to control aquatic weeds and as an aquatic algicide growth regulator. It has also been used for sugar beets, turf, hops sucker suppression; alfalfa, clover desiccants; potato vine killers. The major source of endothall in drinking water is runoff from herbicide use.

Some people who drink water containing endothall in excess of the maximum contaminant level may experience **gastrointestinal inflammation and erosion**.

Endrin: Maximum Contaminant Level = 0.002 mg/L

Endrin is an odorless, colorless organochloride solid that was first produced in 1950 by Shell and Velsicol Chemical Corporation. It is an insecticide which has been used mainly on field crops such as cotton, maize, sugarcane, rice, cereals, ornamentals, and other crops. It has also been used for grasshoppers in non-cropland and to control voles and mice in orchards. Once widely used in the United States, most uses were cancelled in 1980. The major source of endrin in drinking water is residue of banned insecticide.

Some people who drink water containing endrin in excess of the maximum contaminant level may experience **liver problems**. Symptoms of endrin exposure include:

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| <ul style="list-style-type: none">▪ Dizziness▪ Weakness▪ Headache | <ul style="list-style-type: none">▪ Nausea▪ Vomiting▪ Convulsions |
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Epichlorohydrin: Maximum Contaminant Level = 0.01% dosed at 20 mg/L

Epichlorohydrin is a volatile and flammable, clear, colorless, liquid, chlorinated cyclic ether with an irritating, chloroform-like odor that emits toxic fumes of hydrochloric acid and other chlorinated compounds when heated to decomposition. Epichlorohydrin is used for making glycerine and as a monomer/building block for making plastics and other polymers, some of which are used as coagulant aids in water treatment. It is also used in the paper and drug industries as an insect fumigant.

During manufacturing of the epichlorohydrin-based polymeric coagulant aids, a small amount of epichlorohydrin may remain in the coagulant aids as an impurity. When these coagulant aids are used in

water treatment, there is a potential for residual epichlorohydrin to be introduced in water. Drinking water may also contain epichlorohydrin because of raw water contamination from other uses of epichlorohydrin and because of leaching from epichlorohydrin based components and materials used in drinking water treatment, storage and distribution.

Some people who drink water containing high levels of epichlorohydrin could experience **gastrointestinal issues** and may have an **increased risk of getting cancer**.

- Sore throat
- Burning of the Mouth
- Headache
- Nausea
- Vomiting
- Diarrhea
- Shock

Ethylbenzene: Maximum Contaminant Level = 0.7 mg/L

Ethylbenzene is a colorless organic liquid with a sweet, gasoline-like odor. Ethylbenzene is most commonly used in the production of styrene, another organic liquid used as a building block for many plastics. It is also used as a solvent for coatings, and in the making of rubber and plastic wrap. The major source of ethylbenzene in drinking water is **discharge from petroleum refineries**. Some people who drink water containing ethylbenzene in excess of the maximum contaminant level may experience **problems with their liver or kidneys**. Symptoms of ethylbenzene exposure include:

- Cough
- Sore Throat
- Dizziness
- Drowsiness
- Headache
- Burning in chest/throat

Ethylene dibromide (EDB): Maximum Contaminant Level = 0.00005 mg/L

Ethylene Dibromide is a clear, colorless, volatile liquid brominated hydrocarbon with a mild, sweet, chloroform-like odor that emits corrosive and toxic fumes when heated to decomposition. EDB is an effective soil fumigant, insecticide, and nematocide. It is also commonly as an anti-knock in gasoline mixtures, particularly for aviation fuel. EDB is released during the use, storage, and transport of leaded gasoline, as well as during any spills; from its former use as a pesticide; wastewater and emissions from processes and wastewater of the chemical industries that use it. When soil and climatic conditions are favorable, EDB may get into drinking water by runoff into surface water or by leaching into ground water.

Some people who drink water containing ethylene dibromide in excess of the maximum contaminant level may experience **problems with liver, stomach, reproductive system, and kidneys**. The EPA classifies EDB as a **likely carcinogen** for humans based on strong evidence of carcinogenicity in animals and inconclusive evidence of carcinogenicity in an exposed human population. Symptoms of ethylene dibromide exposure include:

- Decreased Sperm Count
- Sperm Abnormalities
- Nausea
- Vomiting
- Abdominal Pain
- Diarrhea
- Lethargy
- Diarrhea
- Metabolic Acidosis*
- Liver and Kidney damage

* A condition in which too much acid accumulates in the body.

Glyphosate: Maximum Contaminant Level = 0.7 mg/L

Glyphosate is an organic solid of odorless white crystals. Glyphosate is a non-selective herbicide used on many food and non-food crops as well as non-crop areas such as roadsides. When applied at lower rates, it serves as a plant growth regulator. The most common uses include control of broadleaf weeds and

grasses in: hay/pasture, soybeans, corn fields; ornamentals, lawns, turf, forest plantings, greenhouses, and rights-of-way. The major source of glyphosate in drinking water is runoff from herbicide use.

Some people who drink water containing glyphosate in excess of the maximum contaminant level may experience **problems with their kidneys or reproductive difficulties**. Symptoms of glyphosate exposure include:

- **Burning sensation in the chest and throat**
- **Cough**
- **Redness of the skin and eyes**

Heptachlor: Maximum Contaminant Level = 0.0004 mg/L

Heptachlor is a white to tan waxy organic solid with a camphor-like odor. When heptachlor breaks down in the environment it forms *heptachlor epoxide*. Heptachlor was most commonly used to kill termites in homes and insects on crops until it was banned in 1978. Currently, the only permitted use of heptachlor products is for fire ant control in buried pad-mounted electric power transformers, and in underground cable television and telephone cable boxes. Heptachlor epoxide adsorbs strongly to soil, but is extremely resistant to biodegrading, persisting for many years in the upper soil layers. Similarly in water, heptachlor epoxide will persist, usually in sediments. It is concentrated extensively in aquatic life. It is taken up into the food chain into animals and milk.

Some people who drink water containing heptachlor in excess of the maximum contaminant level may experience **central nervous system and liver damage, gastrointestinal issues** and may have an **increased risk of getting cancer**. Symptoms of heptachlor exposure include:

- | | |
|---|--|
| <ul style="list-style-type: none">• Convulsions• Tremors• Irritability | <ul style="list-style-type: none">• Salivation• Dizziness |
|---|--|

Heptachlor Epoxide: Maximum Contaminant Level = 0.0002 mg/L

Heptachlor epoxide is an oxidation product of heptachlor formed by many plants and animals, including humans, after exposure to heptachlor. It has been shown to remain in soil treated with heptachlor for over fifteen years and is toxic to animals and humans. Heptachlor was most commonly used to kill termites in homes and insects on crops until it was banned in 1978. Currently, the only permitted use of heptachlor products is for fire ant control in buried pad-mounted electric power transformers, and in underground cable television and telephone cable boxes. Heptachlor epoxide adsorbs strongly to soil, but is extremely resistant to biodegrading, persisting for many years in the upper soil layers. Similarly in water, heptachlor epoxide will persist, usually in sediments. It is concentrated extensively in aquatic life. It is taken up into the food chain into animals and milk.

Some people who drink water containing heptachlor in excess of the maximum contaminant level may experience **central nervous system and liver damage, gastrointestinal issues** and may have an **increased risk of getting cancer**. Symptoms of heptachlor exposure include:

- **Unconsciousness**
- **Convulsions**
- **Tremors**

Hexachlorobenzene: Maximum Contaminant Level = 0.001 mg/L

Hexachlorobenzene is a stable, white, crystalline chlorinated hydrocarbon that emits very toxic fumes of carbon monoxide, carbon dioxide, hydrochloric acid and other chlorinated compounds when heated to decomposition. It does not occur naturally in the environment. Hexachlorobenzene was used as a

fungicide and was also used as a chemical intermediate in the manufacture of dyes, synthesis of organic chemicals, rubber and in wood preservation. It is also used in the production of fireworks and ammunition. Currently, hexachlorobenzene is not used commercially in the United States, it was widely used as a pesticide until 1965. It was also used in the production of rubber and wood preservatives. It breaks down very slowly and still persists in the environment. Small particles stick to soil and remain in sediments in the bottoms of water bodies; it accumulates in plants, grasses, fish, marine animals, birds and animals.

Some people who drink water containing hexachlorobenzene in excess of the maximum contaminant level may experience **liver or kidney problems, reproductive difficulties and an increased risk of cancer.**

Hexachlorocyclopentadiene: Maximum Contaminant Level = 0.001 mg/L

Hexachlorocyclopentadiene is an oily, yellow-green organic liquid with a pungent odor. It is used as a raw material in manufacturing other chemicals, including as an intermediate in some pesticides, flame-retardants, resins, dyes, pharmaceuticals, plastics, etc. The major source of hexachlorocyclopentadiene is discharge from chemical factories.

Some people who drink water containing hexachlorocyclopentadiene well in excess of the maximum contaminant level may experience **problems with their kidneys or stomach.** Symptoms of hexachlorocyclopentadiene exposure include:

- **Abdominal Pain**
- **Burning Sensation**
- **Shock Collapse**
- **Cough**
- **Sore Throat**
- **Headache**
- **Diarrhea**
- **Dizziness**
- **Nausea**
- **Vomiting**
- **Labored Breathing**

Lindane: Maximum Contaminant Level = 0.0002 mg/L

Lindane is the gamma-isomer of benzene hexachloride. It ranges from colorless to white colored, and is a synthetic crystalline solid with a slight musty odor that emits toxic fumes of hydrochloric acid and other chlorinated compounds when heated to decomposition. Lindane is currently used primarily for treating wood-inhabiting beetles and seeds. It is also used as a dip for fleas and lice on pets, and livestock, for soil treatment, on the foliage of fruit and nut trees, vegetables, timber, ornamentals and for wood protection. The major source of lindane in drinking water is runoff/leaching from insecticide used on cattle, lumber, and gardens.

Some people who drink water containing lindane in excess of the maximum contaminant level may experience **problems with their liver and renal (urinary) system, as well as an increased in risk of cancer.** Symptoms of lindane exposure include:

- **Headache**
- **Nausea**
- **Vomiting**
- **Diarrhoea**
- **Dizziness**
- **Tremors**
- **Convulsions**

Methoxychlor: Maximum Contaminant Level = 0.04 mg/L

Methoxychlor is a colorless organic solid with a slightly fruity odor. It is an insecticide preferred to DDT for use on animals, in animal feed, and on DDT-sensitive crops such as squash, melons, etc. Since methoxychlor is more unstable than DDT, it has less residual effect. It has been used extensively in Canada for the control of biting flies, and is also effective against mosquitoes and houseflies. The major source of methoxychlor in drinking water is runoff/leaching from insecticide used on cattle, lumber, and gardens.

Some people who drink water containing methoxychlor well in excess of the maximum contaminant level may experience **problems with their central nervous system**, as well as **reproductive difficulties**. Symptoms of methoxychlor exposure include:

- Convulsions
- Diarrhea
- Nausea
- Vomiting

Oxamyl (Vydate): Maximum Contaminant Level = 0.2 mg/L

Oxamyl is a highly toxic synthetic organic chemical that appears as a white crystalline solid with a slight sulfurous odor. EPA has classified most products containing oxamyl as restricted use pesticides intended for occupational use only for control of insects, mites and nematodes on field crops, fruits and ornamentals. Major sources of oxamyl in drinking water are runoff and leachate from its use as an insecticide and leakage, poor storage, or improper disposal practices related to its use and manufacture. Some people who drink water containing oxamyl in excess of the maximum contaminant level may experience **problems with their central nervous systems**. **Symptoms of oxamyl exposure include:**

- Malaise Muscle
- Weakness
- Dizziness
- Sweating
- Headache
- Salivation
- Nausea
- Vomiting
- Abdominal Pain
- Diarrhea

Polychlorinated biphenyls (PCBs): Maximum Contaminant Level = 0.0005 mg/L

Polychlorinated biphenyls are a group of organic chemicals which can be odorless or mildly aromatic solids or oily liquids. Polychlorinated biphenyls were formerly used in the United States as hydraulic fluids, plasticizers, adhesives, fire retardants, wax extenders, de-dusting agents, pesticide extenders, inks, lubricants, cutting oils, in heat transfer systems, carbonless reproducing paper. The major sources of polychlorinated biphenyls in drinking water are runoff from landfills; and discharge of waste chemicals.

Some people who drink water containing polychlorinated biphenyls in excess of the maximum contaminant level may experience **changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties**, and may have an **increased risk of getting cancer**.

Pentachlorophenol: Maximum Contaminant Level = 0.001 mg/L

Pentachlorophenol is a white organic solid with needle-like crystals and a phenolic odor. The greatest use of pentachlorophenol is as a wood preservative (fungicide). Though once widely used as an herbicide, it was banned in 1987 for these and other uses, as well as for any over-the-counter sales. The major source of pentachlorophenol in drinking water is discharge from wood-preserving factories.

Some people who drink water containing pentachlorophenol in excess of the maximum contaminant level may experience **problems with their liver and kidneys**, and may have **an increased risk of getting cancer**. Symptoms of exposure to pentachlorophenol include:

- Abdominal Cramps
- Diarrhea
- Nausea
- Unconsciousness
- Vomiting
- Weakness
- Cough
- Dizziness
- Drowsiness
- Headache
- Fever
- Labored Breathing
- Sore throat

Picloram: Maximum Contaminant Level = 0.5 mg/L

Picloram is a synthetic organic chemical that appears as a crystalline organic solid with a chlorine odor. Picloram is used in salt form as a systemic herbicide for controlling annual weeds in crops, and in combination with 2,4-D or 2,4,5-T against perennials on non-croplands for brush control. The major source of picloram in drinking water is herbicide runoff. Picloram does not adhere to soil and has been found in ground water.

Some people who drink water containing picloram in excess of the maximum contaminant level may experience **liver problems**. Symptoms of picloram exposure include:

- | | |
|---|--|
| <ul style="list-style-type: none">▪ Nausea▪ Vomiting | <ul style="list-style-type: none">▪ Respiratory Irritation▪ Skin & Eye Irritation |
|---|--|

Simazine: Maximum Contaminant Level = 0.004

Simazine is a white to off-white crystalline powder. Simazine is used as a pre-emergence herbicide used for control of broad-leaved and grassy weeds on a variety of deep-rooted crops such as artichokes, asparagus, berry crops, broad beans, citrus, etc. It is also used in non-crop areas such as farm ponds and fish hatcheries. Simazine's major use is on corn where it is often combined with AAtrex. Other herbicides with which simazine is combined include: *Paraquat*, on apples, peaches; *Roundup* or *Oust* for noncrop use; *Surflan* on Christmas trees; *Dual* on corn and ornamentals.

Some people who drink water containing simazine in excess of the maximum contaminant level may experience **problems with their blood and central nervous system**. Symptoms of simazine exposure include:

- | | |
|--|---|
| <ul style="list-style-type: none">• Contact Dermatitis• Edema*• Erythema** | <ul style="list-style-type: none">• Pruritus ***• Skin/Eye Irritation• Respiratory Irritation |
|--|---|

* *Tissue swelling*

** *Redness of the skin or mucous membranes, caused by hyperemia (increased blood flow) in superficial capillaries.*

*** *Severe itching of the skin*

Styrene: Maximum Contaminant Level = 0.1 mg/L

Styrene is an oily organic, fragrant liquid unsaturated hydrocarbon liquid used chiefly in making synthetic rubber, resins, and plastics and in improving drying oils. Initially, styrene was used primarily in the synthetic rubber industry, but it is currently used as a building block for polymers in making plastics, resins, coatings, and paints.

The major sources of styrene in drinking water are discharge from rubber and plastic factories; and leaching from landfills. Some people who drink water containing styrene well in excess of the maximum contaminant level for many years could develop problems with their **liver, kidney, circulatory and central nervous systems**. Symptoms of styrene exposure include:

- Headache
- Fatigue,
- Depression
- Reduced reaction time, memory, & intellectual function
- Hearing loss
- Peripheral Neuropathy*

**A condition that results in weakness, numbness, and pain from nerve damage, usually in the hands and feet.*

Tetrachloroethylene: Maximum Contaminant Level = 0.005 mg/L

Tetrachloroethylene is a colorless, volatile, nonflammable, liquid, chlorinated hydrocarbon with an ether-like odor that may emit toxic fumes of phosgene when exposed to sunlight or flames. It is most commonly used in the textile industry, and as a component of aerosol dry-cleaning products. The major source of tetrachloroethylene in drinking water is discharge from factories and dry cleaners.

Some people who drink water containing tetrachloroethylene in excess of the maximum contaminant level could have **problems with their liver** and may have an **increased risk of getting cancer**. Symptoms of tetrachloroethylene exposure include:

- Cough
- Dizziness
- Headache
- Drowsiness
- Nausea
- Unconsciousness
- Sore throat
- Cardiac Dysrhythmia*
- Respiratory Arrest

** Improper beating of the heart, whether irregular, too fast, or too slow.*

Toluene: Maximum Contaminant Level = 1 mg/L

Toluene is an organic liquid with a sweet, benzene-like odor. Toluene is a widely used to make benzene and as industrial solvent and is also common additive to gasoline. The major source of toluene in drinking water is discharge from petroleum factories. Some people who drink water containing toluene in excess of the maximum contaminant level may experience **problems with their nervous system, kidneys or liver**. Symptoms of toluene exposure include:

- Burning Sensation
- Abdominal Pain
- Cough
- Sore Throat
- Dizziness
- Drowsiness
- Headache
- Nausea
- Unconsciousness

Toxaphene: Maximum Contaminant Level = 0.003 mg/L

Toxaphene is a solid synthetic organic chemical with an amber waxy appearance and a piney odor. Toxaphene was used as an insecticide for cotton and vegetables, and in livestock and poultry production. In 1982 the legality for many of its common uses was significantly curtailed in the United States. By 1990, it was banned outright. Major sources of toxaphene in drinking water are runoff/leaching from a banned insecticide that was used on cotton and cattle. It is very persistent, remaining in soil for up to 14 years. It is not expected to leach to groundwater. It will not break down by microbial or other means. Though it strongly binds to soils and the sediments of water bodies, it may gradually evaporate to the air where it is slowly broken down by sunlight. Toxaphene has a high potential to accumulate in aquatic life.

Some people who drink water containing toxaphene in excess of the maximum contaminant level may experience **kidney, liver, or thyroid problems**, as well as an **increased risk of cancer**. Symptoms of toxaphene exposure include:

- Convulsions
- Dizziness
- Nausea
- Vomiting

2,4,5-TP (Silvex): Maximum Contaminant Level = 0.05 mg/L

Silvex is a monocarboxylic acid that appears as an odorless white organic powder. Until it was banned US in 1985, Silvex was most commonly used as a post-emergence herbicide for control of woody plants and broadleaf herbaceous weeds in rice and bluegrass turf, in sugarcane, in rangeland improvement programs, and on lawns. Aquatic uses included control of weeds in ditches and riverbanks, on floodways, along canals, reservoirs, streams, and along southern waterways. The major source of silvex in drinking water is residue of the banned herbicide.

Some people who drink water containing 2,4,5-TP in excess of the maximum contaminant level may experience **liver problems**. Symptoms of exposure to silvex include:

- **Diarrhea**
- **Fatigue**
- **Nausea**
- **Vomiting**

1,2,4-Trichlorobenzene: Maximum Contaminant Level = 0.07 mg/L

1,2,4-Trichlorobenzene is an aromatic, colorless organic liquid. The greatest use of 1,2,4-trichlorobenzene is primarily as a dye carrier. It is also used to make herbicides and other organic chemicals; as a solvent; in wood preservatives; in abrasives. It was once used as a soil treatment for termite control. The major source of 1,2,4-trichlorobenzene in drinking water is discharge from textile finishing factories.

Some people who drink water containing 1,2,4-trichlorobenzene in excess of the maximum contaminant level may experience problems with their **adrenal glands**. Symptoms of 1,2,4-trichlorobenzene exposure include:

- **Abdominal Pain**
- **Coughing/Sore throat**
- **Nausea**
- **Vomiting**
- **Redness of skin & eyes**

1,1,1-Trichloroethane: Maximum Contaminant Level = 0.2 mg/L

1,1,1-Trichloroethane is an organic liquid with a chloroform-like odor. It is most commonly as a solvent removing grease from machined metal products, in textile processing and dyeing, and in aerosols. The major source of 1,1,1-trichloroethane in drinking water is discharge from metal degreasing and other factories.

Some people who drink water containing 1,1,1-trichloroethane in excess of the maximum contaminant level may experience **problems with their liver, nervous system, or circulatory system**. Symptoms of 1,1,1-trichloroethane exposure include:

- | | |
|-------------------------|-------------------------------|
| • Abdominal Pain | • Headache |
| • Nausea | • Dizziness |
| • Vomiting | • Drowsiness |
| • Diarrhea | • Loss of Coordination |
| • Cough Sore | • Unconsciousness |
| • Throat | |

1,1,2-Trichloroethane: Maximum Contaminant Level = 0.005 mg/L

1,1,2-Trichloroethane is a volatile liquid organic chemical with a chloroform-like odor. 1,1,2-Trichloroethane is used to make vinylidene chloride which is in turn used to make synthetic fibers and plastic wraps. It is also used in adhesives, production of Teflon tubing, in lacquer and coating formulations, and as a solvent for fats and oils. 1,1,2-Trichloroethane evaporates during its use in manufacturing other products and as a solvent. It is also released in wastewater from these uses, in leachates, and volatile emissions from landfills.

Some people who drink water containing 1,1,2-trichloroethane in excess of the maximum contaminant level may experience **problems with their liver, kidneys, or immune systems.** Symptoms of 1,1,2-Trichloroethane exposure include:

- Irritation of Eyes/Nose
- Dermatitis*
- CNS Depression**
- Dizziness
- Drowsiness
- Unconsciousness
- Headache
- Nausea
- Shortness of Breath
- Liver & Kidney damage

*An itchy inflammation of the skin.

** CNS = Central Nervous System

Trichloroethylene: Maximum Contaminant Level = 0.005 mg/L

Trichloroethylene is a liquid volatile organic chemical that ranges in appearance from colorless or blue and has a chloroform-like odor. Trichloroethylene is a solvent and extractive in the manufacture of foods. It is also commonly used to remove grease from fabricated metal parts and in the production of some textiles. The major source of trichloroethylene in drinking water is discharge from metal degreasing sites and other factories. Wastewater runoff from metal finishing, paint and ink formulation, electrical components, and rubber processing industries may also contain trichloroethylene.

Some people who drink water containing trichloroethylene in excess of the maximum contaminant level may experience **problems with their liver and may have an increased risk of getting cancer.** Symptoms of trichloroethylene exposure include:

- Sore Throat
- Aspiration
- Cardiac Dysrhythmia*
- Respiratory Arrest
- Dizziness
- Drowsiness
- Headache
- Weakness
- Nausea
- Unconsciousness

* Improper beating of the heart, whether irregular, too fast, or too slow.

Vinyl Chloride: Maximum Contaminant Level = 0.002 mg/L

Vinyl Chloride is a chlorinated hydrocarbon that appears as a colorless, highly flammable gas with a mild, sweet odor that may emit toxic fumes when heated to decomposition. Vinyl chloride is used in the manufacture of numerous products in building construction, automotive industry, electrical wire insulation and cables, piping, industrial and household equipment, and medical supplies. It is of particular importance in the rubber, paper, and glass manufacturing industries. Vinyl chloride is also a primary component of polyvinyl chloride (PVC) manufactured plastics.

Vinyl chloride can migrate into groundwater from hazardous waste sites as a result of improper disposal or leakage from storage containers or spills, from landfills, or from the breakdown of other chemicals. Groundwater may serve as a drinking water supply. Vinyl chloride may enter finished drinking water from the flow of water through older PVC piping made before 1977, but a more recent study suggests that the extraction of vinyl chloride may diminish over time. Since 1977, product standards have controlled the release of vinyl chloride from PVC pipes.

Some people who drink water containing vinyl chloride in excess of the maximum contaminant level may have an **increased risk of cancer**. Symptoms of exposure to vinyl chloride include:

- **Weakness**
- **Dizziness**
- **Eye Redness**
- **Drowsiness**
- **Headache**
- **Weight loss**
- **Cyanosis of extremities ***
- **Abdominal Pain**
- **G.I Bleeding**
- **Liver enlargement**
- **Fibrosis ****
- **Cirrhosis *****
- **Spleen enlargement**

* Bluish discoloration, especially of the skin and mucous membranes, due to excessive concentration of deoxyhemoglobin in the blood caused by deoxygenation.

** The thickening and scarring of connective tissue

*** Chronic liver damage from a variety of causes leading to scarring and liver failure.

Xylenes (total): Maximum Contaminant Level = 10 mg/L

Xylenes refer to any of three toxic flammable oily isomeric aromatic hydrocarbons that are dimethyl homologues of benzene. The common use for xylenes is as a solvent. Other uses include: in gasoline as part of the BTX component (benzene-toluene-xylene); Xylene mixtures are also used to make phthalate plasticizers, polyester fiber, film and fabricated items. The major sources of xylenes in drinking water is discharge from chemical and petroleum factories.

Some people who drink water containing xylenes in excess of the maximum contaminant level may experience **damage to their central nervous system**. Symptoms of exposure to xylenes include:

- **Headache**
- **Dizziness**
- **Drowsiness**
- **Nausea**
- **Vomiting**
- **Tremors**
- **Respiratory Depression**
- **Ventricular Arrhythmias***
- **Acute Pulmonary Edema ****
- **Reversible Hepatic Impairment*****
- **Ataxia ******

* Abnormal heart rhythms that originate in the bottom chambers of the heart.

** A condition caused by excess fluid in the lungs.

*** Liver failure

**** Loss of full control of bodily movements.

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