

Introduction

This handout provides supporting information to the attached analytical results. The information below is targeted towards exposure of these compounds in drinking water sources. While there is information available on exposure to these compounds in occupational settings, information can be limited on the presence of these compounds in drinking water. Where possible, the City of San Angelo (City) has provided information related to the presence of these compounds in drinking water rather than exposure in an occupational setting.

Analytical results accompanying this handout present the findings from sampling conducted through Thursday, February 11th by the City and the Texas Commission on Environmental Quality (TCEQ). The City has collected 52 individual samples over 4 sampling events in addition to TCEQ performing their own sampling. **No abnormal test results have been detected in San Angelo's system outside of the PaulAnn subdivision and the adjacent industrial area.**

Units of Measurement-Parts Per Billion

There are 1,000 million in a billion. Parts per billion also can be expressed as micrograms per liter (ug/L). This measurement is the mass of a chemical or contaminate per unit volume of water. Seeing ppb or ug/L on a lab report means the same thing. Analytical results accompanying this handout are all measured in parts per billion. To put the measurement of ppb or ug/L into perspective the following analogies are used:

One ppb is equivalent to:

- One inch in 15,783 miles, or
- One second in 31.7 years.

Detected Compounds (Refer to attached testing results and “Reference Map for Sampling Data”)

Benzene

Maximum contaminant level in drinking water: 5 ug/L

Benzene is a clear, colorless, highly flammable and volatile, liquid aromatic hydrocarbon with a gasoline-like odor. It evaporates into air very quickly and dissolves slightly in water. Many people report being able to smell benzene in concentrations as low as approximately 60,000 ppb in air. Many people report being able to detect the taste of benzene in water in concentrations as low as 500 – 4,500 ppb in water.

Benzene is commonly present in the everyday environment, including in the outdoor environment, in the workplace, and in the home. Industrial processes are the main sources of benzene in the environment.

Benzene is slightly soluble in water and can pass through the soil into underground water. Benzene in the environment does not build up in plants or animals.

For most people, the level of exposure to benzene through food, beverages, or drinking water is not as high as through air. Benzene has been detected in some bottled water, liquor, and food.

Primary source: Center for Disease Control; Agency for Toxic Substances and Disease Registry

Naphthalene

Maximum contaminant level in drinking water: Not regulated in Drinking Water

Naphthalene is a white solid that evaporates easily. It is also called mothballs, moth flakes, white tar, and tar camphor. Moisture and sunlight cause naphthalene to break down in the air. Naphthalene in water is destroyed by bacteria or evaporates into the air.

Primary source: Center for Disease Control; Agency for Toxic Substances and Disease Registry

Acetone

Maximum contaminant level in drinking water: Not regulated in Drinking Water

Acetone is a colorless, volatile, flammable organic solvent.

Acetone is a widely used material. It is often used to breakdown fats, oils, waxes, resins, rubber, plastics, lacquers, varnishes, and rubber cements. It is also used as a reagent in the manufacturing of coatings, plastics, pharmaceuticals, and cosmetics. It is used to produce explosives, rayon, photographic films, and isoprene. It is also used for the extraction of various compounds from animal and plant substances; in paint and varnish removers; purifying paraffin; and for hardening and dehydrating tissues.

Main routes of exposure include inhalation, skin contact and eye contact. Ingestion is not a common exposure pathway due to its tendency to rapidly evaporate from water.

Primary source: Center for Disease Control; Agency for Toxic Substances and Disease Registry

Tetrahydrofuran

Maximum contaminant level in drinking water: Not regulated in Drinking Water

Tetrahydrofuran is a colorless liquid with an odor similar to rubbing alcohol. Tetrahydrofuran is used to make a variety of products, like plastics and rubbers. Many people come in contact with tetrahydrofuran on a regular basis because it is used in common items like adhesives and PVC pipe. Tetrahydrofuran enters

the environment and water through the waste created by manufacturing processes. Tetrahydrofuran moves easily from water to air and breaks down quickly. In certain conditions it can biodegrade.

In 2012 the EPA evaluated the health effects of tetrahydrofuran. Based on the EPA's evaluation the State of Minnesota developed a guidance value of 600 ppb for tetrahydrofuran in drinking water. The State of Minnesota in cooperation with the EPA determined that a person drinking water at or below the guidance value of 600 ppb (600 µg/L) would have little or no risk of health effects.

Primary Source: Minnesota Department of Health, Health Risk Assessment Unit

Toluene

Maximum contaminant level in drinking water: 1,000 µg/L

Toluene is a clear, colorless liquid which becomes a vapor when exposed to air at room temperature. It has a sharp or sweet odor. Toluene occurs naturally in crude oil and in the tolu tree. Products that may contain toluene are used in many industries and can be found in many workplaces. It is used to make paints, paint thinners, fingernail polish, lacquers, adhesives, and rubber and in some printing and leather tanning processes. It is also added to gasoline along with benzene and xylene to improve octane ratings.

Toluene can be released into the air, water, and soil at places where it is produced or used. Toluene is commonly found in air, particularly when there is heavy vehicular traffic. Indoor air samples can contain higher levels of toluene in places where products such as paint thinners, solvents, or tobacco products are used. Toluene can enter surface waters and groundwater from solvent and petroleum products spills.

Toluene will readily evaporate into the air or be degraded by microorganisms in lakes and rivers. Toluene in surface soils rapidly evaporates into the air. Toluene is readily broken down to other chemicals by microorganisms in the soil.

Primary source: Center for Disease Control; Agency for Toxic Substances and Disease Registry

Acrylonitrile

Maximum contaminant level in drinking water: Not regulated in Drinking Water

Acrylonitrile is a colorless, liquid, man-made chemical with a sharp, onion or garlic-like odor. Acrylonitrile is used mostly to make plastics, acrylic fibers, and synthetic rubber. Because acrylonitrile evaporates quickly, it is most likely to be found in the air around chemical plants where it is made. Acrylonitrile breaks down quickly in the air. It has been found in small amounts in the water and soil near manufacturing plants. In water, acrylonitrile usually breaks down in about 1 to 2 weeks, although this can vary depending on conditions. The EPA recommends that levels of acrylonitrile in lakes and streams should be limited to 0.058 ppb.

Primary source: Center for Disease Control; Agency for Toxic Substances and Disease Registry

Styrene

Maximum contaminant level in drinking water: 100 ug/L

Styrene is primarily a synthetic chemical. It is a colorless liquid that evaporates easily and has a sweet, often unpleasant, smell. It dissolves in some liquids but does not dissolve easily in water.

Primary source: Center for Disease Control; Agency for Toxic Substances and Disease Registry

2-Butanone

Maximum contaminant level in drinking water: Not regulated in Drinking Water

2-Butanone is a colorless liquid with a sharp, sweet odor. It is typically a manufactured chemical, but it is also present in the environment from natural sources. Nearly half of its use is in paints and other coatings because it will quickly evaporate into the air and it dissolves many substances. It is also used in glues and as a cleaning agent. 2-Butanone also occurs as a natural product in some trees and found in some fruits and vegetables in small amounts. It is also released to the air from car and truck exhausts.

Primary source: Center for Disease Control; Agency for Toxic Substances and Disease Registry

1,2- Dichloroethane

Maximum contaminant level in drinking water: 5 ug/L

1,2-Dichloroethane is a clear, manufactured liquid that is not found naturally in the environment. It evaporates quickly at room temperature and has a pleasant smell and a sweet taste. The most common use of 1,2-dichloroethane is to make vinyl chloride, which is used to make a variety of plastic and vinyl products including PVC pipe and other important construction materials, packaging materials, furniture and automobile upholstery, wall coverings, housewares, and automobile parts. 1,2-Dichloroethane is also used as a solvent and is added to leaded gasoline to remove lead. In the household, 1,2-dichloroethane was formerly a component of some cleaning solutions and pesticides; some adhesives, such as those used to glue wallpaper or carpeting; and some paint, varnish, and finish removers. Although large amounts of 1,2-dichloroethane are produced today, most is used to make other chemical products.

In water, 1,2-dichloroethane breaks down very slowly and most of it will evaporate to the air. Low levels of 1,2-dichloroethane have been found in the air near industries where it is made or used in manufacturing. Small amounts of 1,2- dichloroethane have also been found in foods.

Primary source: Center for Disease Control; Agency for Toxic Substances and Disease Registry

1,2,4-Trimethylbenzene

Maximum contaminant level in drinking water: Not regulated in Drinking Water

Trimethylbenzenes (TMBs) are a major component of products created through petroleum processing. TMBs are found in crude oil, coal tar, and in gasoline as a fuel additive. Some manufacturers also use TMBs to make dyes, perfumes, and resins; as well as consumer products including spray paints, fuel injector cleaners, hobby paints, shoe polish, pharmaceuticals, and other fuel additives.

TMBs enter the environment when they are released to the air or into the water. When TMBs are released to water, they can bind to the soil or evaporate into the air.

Primary Source: Minnesota Department of Health, Health Risk Assessment Unit

Total Trihalomethanes (Chloroform, Bromodichloromethane, Dibromochloromethane, Bromoform) - THMs

Maximum contaminant level in drinking water: 80 ug/l as the sum of the four THMs

Trihalomethanes are a group of chemicals that can form when organic matter in water is treated with disinfectants such as chlorine. The most common of these chemicals is trichloromethane (also called chloroform), but others, such as dibromochloromethane, bromodichloromethane, or bromoform can also be found. The sum of these four chemicals is referred to as total trihalomethanes (TTHMs). TTHMs are present at low levels in most chlorinated water supplies.

TTHMs are routinely monitored in all Texas public water systems.

Primary Source: USEPA Drinking Water Requirements for States and Public Water Systems, Stage 1 and Stage 2 Disinfectants and Disinfection Byproducts Rule