WHAT IS NITRATE?

NITRATE: Is a compound formed when nitrogen combines with oxygen. It occurs often in nature when nitrogen in the air reacts with oxygen or ozone. It is produced by plants and animals, and is a common ingredient in smoke and exhaust.

Occurrence and Sources of Nitrate in Water Supplies

Naturally occurring levels of nitrate in surface an groundwater do not generally exceed 2 milligrams per liter (mg/L). Water with less than 10 mg/L nitrate as nitrogen (NO_3-N) is generally safe for use in foods and beverages. Sources of elevated nitrate levels include fertilizers, septic systems, animal feedlots, industrial wastes, and food processing waste. It also occurs naturally in certain geological settings, and can result from decaying organic matter. Elevated levels of nitrate found in well water are often used as indicators of improper well construction or location, overuse of chemical fertilizers or improper disposal of human and animal waste.

What are the Health Effects of Drinking Nitrate Contaminated Water?

The United States Environmental Protection Agency (U.S EPA) has set a maximum contaminant level (MCL) of 10 mg/L for nitrate (NO_3-N) in public water supplies. Nitrate levels above 10 mg/L may represent a serious health concern for **infants** and **pregnant** or **nursing women.** Adults receive most nitrate exposure from food. Infants, however, receive the greatest exposure from drinking water because most of their food is in liquid form. Nitrate can interfere with the ability of the blood to carry oxygen to vital tissues of the body in infants of one year old or younger. The result is called methemoglobinemia, or "blue baby syndrome".

Pregnant women may be less able to tolerate nitrate, and nitrate in the milk of nursing mothers may affect infants directly. These persons should not consume water containing more than 10 mg/L nitrate directly, added to food products, or beverages (especially in baby formula). Other domestic use of this water supply is acceptable, including washing and bathing.

The 10 mg/L standard for NO_3-N in public drinking water supplies has been devised to protect a select group of sensitive persons (infants, and pregnant and nursing women).

Available health information suggests that non-sensitive persons, including healthy adults and children older than one year in age, can consume water containing up to 20 mg/L nitrate without experiencing adverse health effects. The Division recommends, however, that all persons minimize their exposure to nitrate as much as possible. It has been suggested in preliminary studies that excessive nitrate ingestion may be linked to gastric cancer. This link, however, has not been firmly established and current exposure levels do not appear to put the population at risk.

Removing Nitrate from Drinking Water

Heating or boiling water containing nitrate will not remove the nitrate, but may actually concentrate it. Options to consider if the water supply is contaminated with nitrate above the 10 mg/L level, include using bottled water for drinking, and for food and beverage preparation, or installing a home water treatment unit. Mechanical filters or chemical disinfection, such as chlorination, do not remove nitrate from water. Nitrate may successfully be removed from water using treatment processes such as ion exchange, distillation, and reverse osmosis. These treatment techniques require careful maintenance and sampling to achieve and confirm effective operation. If a treatment system is to be used, one with National Sanitation Foundation (NSF) certification should be selected. For additional information on these options, contact the Drinking Water Program of the Oregon Health Division at (503) 731-4899 or (503) 731-4010.