Sodium

Sodium is a very active metal which does not occur freely in nature. Man's intake of sodium is mostly influenced by the use of salt, where its role in the body is to help maintain water balance. Normally, the contribution of sodium from drinking water is small in comparison to the contributions from other sources. Softening of water by ion exchange or the lime-soda ash process may significantly increase the sodium content of drinking water.

Sodium restrictive diets are essential in treating congestive heart failure, hypertension renal disease, cirrhosis of the liver, toxemias of pregnancy and Meniere's disease. Diets for those who must restrict their sodium intake can be designed to allow for the sodium from the water supply, or the affected person(s) can be advised to use other sources of drinking water. Knowledge of the sodium content of a water supply and maintenance of it at the lowest practicable concentration is clearly helpful in arranging diets with suitable sodium intake.

High concentrations of sodium may also reduce the suitability of water for irrigation purposes by altering soil chemistry and absorption properties. With continued use, the soil eventually will refuse to absorb moisture.

Although no evidence has shown that high sodium levels in any way affect normal individuals, recommended levels have been set at 110-270 mg/L.

Sulfates

There are three reasons for limiting the concentrations of sulfates in drinking water: (a) waters containing appreciable amounts of sulfate tend to form hard scales in boilers and heat exchangers; (b) sulfates cause taste effects; (c) sulfates can cause laxative effects with excessive intake, especially in the presence of magnesium or sodium. This laxative effect is commonly noted by newcomers and casual users of waters high in sulfates. These effects vary with the individual, and within reasonable limits appear to last only until one becomes accustomed to using such water. Whether this effect will occur, and its severity, varies greatly with such factors as the level of sulfate in the water being consumed and the level of sulfate to which the transient is accustomed. For these reasons the recommended limit is 250 mg/L.

Chlorides

The presence of too great a concentration of chloride ions in drinking water can result in two undesirable effects. First, the consumer may detect an objectionable taste in the water. Second, corrosion of the pipes in hot water systems may occur. Existing evidence suggests that consumers react to excessive amounts of chlorides by either treating the water themselves or by rejecting the water supply. Therefore, a limit of 250 mg/L has been set for chloride ion concentration.

For many years the chloride ion was used as an index of pollution of the water source. Thus, any sudden increase in the chloride content of a water supply should be investigated as a possible indication of pollution.

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Nitrates

High nitrates are of concern in drinking waters when such water is used in infant feeding. When nitrate is ingested by infants, it is converted to nitrite and picked up by the blood. There it destroys the oxygen-carrying capacity of the blood, a condition known as "methemoglobinemia." This results in an oxygen-starvation condition and the infant appears blue. Serious poisonings, sometimes fatal, have occurred in infants less than six months old following ingestion of water containing nitrate nitrogen at concentrations greater than 10 mg/L. High nitrate concentrations can occur in wells located in or near feedlots, barnyards, sewage disposal systems or areas of high fertilizer application. High nitrate concentrations normally indicate groundwater contamination.

Fluorides

Small amounts of fluorides are found in water supplies throughout the United States. Their physical importance is the effect on the teeth during the period when permanent teeth are being formed. When the concentration is optimum, 1.2 mg/L, no ill effects will result and the caries (tooth decay) rate will be 60 to 65 percent below the rates in communities using water supplies with little or no fluoride. Excessive fluorides in water have been shown to be associated with the dental defect known as "mottled enamel," a brownish disfiguration of the teeth.

pH

The pH of water indicates whether the water is acid or alkaline. Numbers lower than 7 indicate acidity; numbers higher than 7 indicate alkalinity. Drinking water with a pH of between 6.5 and 8.5 is generally considered satisfactory. Acid waters tend to be corrosive to plumbing and faucets, particularly if the pH is below 6. Alkaline waters are less corrosive. Waters with a pH of above 8.5 may tend to have a bitter or soda like taste. The pH of water may have an effect on the treatment of water. Water with a pH of 7.0 to 8.5 will require more chlorine for the destruction of pathogens than will water that is slightly acidic.

Chemical Analysis

For a chemical analysis, a sample of at least one quart needs to be submitted in a clean glass or plastic container (metal must not be used).

The following information must accompany the sample:

- Name and address
- Date and time of sampling
- Desired analysis
- Sample source
- Well description (depth, type, location)
- Other pertinent facts

This serves to complete our records and may help other individuals when looking for water supplies in the same area.

Water samples for chemical analysis are to be sent to:

North Dakota Department of Environmental Quality
Chemistry Division
2635 E. Main Ave.
Bismarck, N.D. 58501