Mass Water Supply

Sources

- **Ground water:** After rain fall, water seeps into the ground and is trapped in pores between sand, clay and rock formations forming aquifers. Aquifers are a major source of drinking water and the water is accessed by drilling of wells into the ground.
- **Surface Water:** is all water that is naturally open to the atmosphere, such as lakes, rivers, seas and reservoirs. This is a less preferable source of drinking water than ground water due to the fact that its properties (chemical, physical and biological) are prone to fluctuations. As a result there is the need for constant monitoring and treatment. For these reasons, the preferred source of surface water is that from large valley basins, where as pond water is rarely used as drinking water (shallow with muddy bottom).

There are five classifications of surface water according to its level of purity:

1. Very clean
2. Clean
3. Polluted
4. Strongly polluted
5. Very strongly polluted

For drinking water, it is important that the water source is relatively clean. As a result classes III. and IV. are not suitable for drinking even after tratement (at high cost) but may be used as service water.

Treatment

The nature and quality of the water source determine the intensity of water treatment for a particular supply and distribution.

- **Ground water treatment:** Contents of components and minerals may not be suitable for human consumption and may not meet the technical requirements of the treatment and distribution system. If sources of water contain iron or manganese, these minerals must be converted into insoluble salts and then removed by filtration. Excess carbonic acids must be precipitated by lime or removed by filtration through marble gravel, Lime and soda treatment, followed by filtration through artificial resins is the treatment of choice for excess hardness of water. As for technical requirements, polyphosphates are added which dissolve Ca and Mg sediments thus preventing the coagulation of hard water in pipes.

- **Surface water treatment:** this is a complex process involving the interactions between the physical, chemical and biological properties of water. The processes involved are as follows.

1. Impoundment and reservoir storage
2. Clarification/ Coagulation
3. Sedimentation
4. Filtration
5. Disinfection

Distribution

Water is conveyed via pipes. The driving pressure may be actively maintained by pumping or it may be passive if the reservoir is situated high enough compared with the areas it supplies, The areas around the distribution pipes must be kept free from pollution. To minimize chances of contamination (in the case of cracking of pipes), a positive pressure ought to be maintained within the pipes. Sewage and drainage pipes should never be constructed as to overly water distribution pipes.

Drinking Water Issues in the Czech Republic

Water quality in the Czech Republic has improved significantly within the last decade. However there is till need and room for improvement since, problems concerned with microbial contamination still occur. In addition, the documented presence of organochlorines (chlorination by-product) and the rising concentrations of endocrine disruptors in the water supply are increasing receiving attention not least due to the adverse health effects associated with these agents.

Advances:

1. The elimination of stage V. level of water purity both in main water courses and large tributaries. Stage III. sites still exist as well as a limited numbers of stage IV. Sites.
2. 70% decrease in organic pollutants released into water within the last decade.
3. A decrease in the overall level of nitrates and phosphorus products over the decades. This is mainly due to the regulation of agricultural activities. For example, a decrease in the numbers of cattle bread and a decrease in

the use of industrial fertilizers.
4. Decreased pollution from point sources. 77.4% of Czech inhabitants are connected to the public sewage system.

Drawbacks:

1. Pollution from municipal sources. For example, settlements with populations of 2000 –10000 inhabitants. This is due to the fact that it is not cost effective to build water treatment plants for such small populations.
2. Area/ Diffuse sources are increasingly becoming a major source of pollution. (The opposite is so for point sources).
3. Majority of waste waste-water treatment plants are not equipped with the third stage treatment facilities (concerned with the removal of nitrates and phosphorus.)

Links

Related Articles

- Drinking Water
- Individual Sources of Drinking Water

Bibliography

1. Vladimir Bencko et al: Hygiene and Epidemiology, (Selected Chapters) _ Charles University Press.
2. Joseph LaDou: Current Occupational and Environmental Medicine_ Lange,