Paper Number: 1019

Evaluation of Fresh Groundwater Resources for Public Water Supply in Emergencies (Case Studies from Lithuania and Russia)

Satkunas, J.[1], Zektser, I.[2]

[1]Lithuanian Geological Survey, Konarskio 35, Vilnius LT-03123, Lithuania, jonas.satkunas@lgt.lt,
[2]Water Problems Institute of Russian Academy of Sciences. Prof. Igor Semenovich Zektser, zektser@iwp.ru

---

Fresh groundwater plays a substantial role in public water supply in Europe. Countries which use high percentage of groundwater for public water supply could be listed in following order: Lithuania– 100%, Denmark – 100%, Italy – 93%, Hungary – 90%, Poland – 70%, Estonia – 65%, Romania – 43%, UK– 35%, Scandinavian countries, Ireland – 15%. An increase in the share of groundwater to the public water supply in bigger cities is observed.

All potable water resources (100%) in Lithuania are extracted only from groundwater aquifers and the wellheads for public water supply in most cases are located in urbanised territories. Groundwater resources in Lithuania are over 3.75 million m^3 per day: about three times more than the current water abstraction rate for centralised water supply.

In the Russian Federation the larger the city (by population), the smaller is the contribution of groundwater to drinking water supply. It is primarily due to the inhomogeneity of the local hydrogeological conditions, and often due to the lack of groundwater resources for water supply of large cities. In cities with a population over a million people, groundwater use is very small (except Ufa), and in cities with a population of less than 100,000 people 80–90% of the drinking water supply is based on groundwater. Cities where surface water (which is not protected from contamination) is the only source of drinking water are the following: Moscow, St. Petersburg, Ekaterinburg, Omsk, Volgograd, Chelyabinsk, Rostov-on-Don. These major Russian cities are under the threat of failure or degradation of drinking water supply systems based on the use of surface water because of accidents, floods, earthquakes, terrorist attacks, etc.

At present the tendency to increase groundwater use for public water supply is observed. This can be explained by the well-known fact that groundwater, as a source of water supply, has some advantages in comparison with surface water. Groundwater generally contains micro- and macro-components needed for the human body, does not require expensive treatment; and is much better protected from contamination. Groundwater resources are much less susceptible to seasonal and long-term variations. They are usually located near water users. Groundwater is essentially the only source of water supply in regions where surface water freezes or dries up. Groundwater is not only natural resources but also an important component of the environment. Any changes in other components of the environment such as atmospheric precipitation, evaporation, river runoff, etc., influence groundwater resources and quality. And vice versa variations in groundwater regime especially due to the water withdrawal in large scales could cause changes in landscapes, vegetation, sea water intrusion, or activation of karst processes.

In urban areas the groundwater resources must be protected from contamination by setting wellhead protection zones, managing and remediating geopollution sites.

In order to facilitate communication of value of groundwater the IUGS Commission on Geoscience for Environmental Management (GEM) in October 2011 set a working group on Working Group for Drinking Water (chair Igor Zektser) (www. IUGS-GEM.org).