

## **RELEASE OF NATURAL RADIONUCLIDES IN THE CZECH REPUBLIC - FROM WATER TREATMENT PLANTS WHERE WATER FROM UNDERGROUND WATER SOURCES IS TREATED**

Růžena Šinágllová

State Office of Radiation Safety, Prague

Water treatment plants where water from underground water sources is treated are classified as workplaces where exposure to natural sources may increase significantly. Natural radionuclides contained in the raw water may be present in the sludge, filter cartridges and waste waters. A release of natural radionuclides from such workplaces into the environment is permitted only in the scope not exceeding clearance levels laid down in an implementing legal regulation or in the scope and under the terms specified in a licence issued by the State Office for Nuclear Safety (SONS). An increased occurrences of natural radionuclides can be found only in groundwater that were in contact with the geological environment with an increased incidence of radionuclides - members of the uranium and thorium decay series. The reason for exceeding the guidance levels for drinking water and bottled water is usually natural occurrence of uranium and radium isotopes. During water treatment when water from underground sources is used it is necessary to pay attention to the waste products that arise during process - water supply sludge, filter cartridges, waste water. Certain technologies used in water treatment plants are effective also for removing natural radionuclides. For example during removal of iron and manganese using filters with cartridges made from modified water sands the capture of radium isotopes occurs with efficiency up to 80%. Waterworks sludge is most often disposed by discharging into sewer or into the sludge lagoons. Wastewater is usually discharged into sewer or watercourses. The filter cartridges are disposed at landfill or regenerated. Some used sand filters containing radium may also serve as remediation materials - for example during the remediation of tailing ponds. Since 2010 in the Czech Republic is set hygienic limit 15 µg/l for concentration of natural uranium in drinking water due to uranium chemical toxicity. In many water treatment plants there are newly installed technologies for removing uranium from drinking water. Part of these devices are most often ion exchange resin filters that capture the uranium from the treated water. In the cartridges along with uranium other radioactive elements (eg. radium) are captured as well. The advantage of these technologies is that flushing is not required so no wastewater occurs. Used ion exchangers with higher content of uranium are processed in the chemical treatment of uranium ores, managed by DIAMO, state enterprise. The purpose of this post is to inform about issue involving release of natural radionuclides from water treatment plants and about rules that had to be followed during process in order to protect people and environment against the adverse events of ionizing radiation.