

Uranium, Mining and Hydrogeology

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Preface

When, in 1789, the German chemist Martin H. Klaproth investigated an ore found in the small mine “Georg Wagsfort” close to the town of Johann Georgenstadt he did not suspect that this would be the death sentence for the town. He discovered Uranium from the Pechblende mineral and characterized it as distinct element though he did not obtain it in the pure metallic state. As early as from 1819 on this ore was mined in Johann Georgenstadt for the production of dyes. Roughly two third of the ore produced was used for the famous yellow-green Uranium glass. The great Uranium rush started immediately after World War II and within a few years the town of Johann Georgenstadt and other sites in the Erzgebirge were completely devastated by inconsiderate mining through the UDSSR and the WISMUT SDAG. From 1945 to 1989, more than 231.000 tons of U_3O_8 were mined and produced within a very small area of Saxonia and Thuringia. Only the USA and Canada produced more Uranium than the former GDR during that period. After the Reunification of Germany Uranium mining was stopped and the rehabilitation work started. Nearly 20 years later, in 2008, most of this rehabilitation work is done on the one side and we face a completely new situation with respect to Uranium mining on the other side. While the Uranium price has plummeted at the beginning of the 1990s, a Uranium mining renaissance can be observed recently since prices screwed up for two reasons: highly enriched Uranium from dismantling of nuclear weapons is no longer available for “diluting” by means of depleted uranium stored as UF_6 and an increased demand of nuclear fuel due to newly built nuclear power plants in China, India, and other parts of the world.

Therefore the impact of Uranium mining and milling on the environment and in particular on water is still an important issue. Additionally, the intensive use of Phosphate fertilizers containing significant amounts of Uranium and the combustion of coal and oil emits Uranium into the environment.

Although Uranium is an element which was investigated thoroughly during the last six decades we still face enormous gaps in knowledge with respect to the chemical toxicology of Uranium and its behavior in environmental compartments at trace concentrations in particular at the water-rock interface and its interaction with biomass. Thus the fifth International Conference Uranium Mining and Hydrogeology (UMH V) at Freiberg is an excellent opportunity for scientists and engineers to exchange experiences and new scientific results as have been the conferences in 1995, 1998, 2002, and 2005.

Freiberg, September 2008

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