

## Uranium Mining and Rehabilitation in Germany

Broder J. Merkel

Silver was mined in the Erzgebirge since 800 years but sometimes historical miners found an ore that they called "Pechblende". Pech is the German word for "bad luck" and the miners did not know anything about this ore until Henry Becquerel 1896 detected its radioactivity. After Marie Curie worked with the same ore from this area some interest grew in several spa using groundwater with elevated radium concentrations. However, not before the end of the Second World War, uranium mining was of particular interest in this region. In 1946 the Sowjet Union founded the WISMUT enterprise in the occupied part of Germany and started to mine uranium from several sites in Saxonia and Thuringia. In the early period more than 100.000 employees worked under very poor conditions. From 1957 to 1960 a number of small mines and milling sites were closed down and WISMUT focussed on big mines like Schlema-Alberoda and Koenigstein and one big milling and tailing site at Crossen. The number of employees decreased and was around 26.000 people in the 80's. Production of uranium accumulated in the period from 1964 to 1990 to be 218.000 t [U]. In comparison to the United States with 339.000 t and Canada with 258.000 t in the same period, WISMUT was the third largest uranium producer of the world and a state within a state with extreme security rules and privileges for their employees but still poor environmental measures.

When the wall came down and reunification happened (1989-1991) uranium production was stopped and rehabilitation work started. The Federal Government of the reunified Germany being now the owner of WISMUT decided to instruct WISMUT with the rehabilitation of the heavily contaminated sites although WISMUT had only little experience in rehabilitation work and was consultant and contractor at the same time. Furthermore the Federal Government allocated about 13 billion German marks for the rehabilitation. This is about 60 German mark per kg uranium only for rehabilitation and has to be compared to a marked price of about 60 to 80 German mark. Within ten years most of the deep mines were flooded, treatment plants installed, milling sites decontaminated and heaps, waste rock piles, and tailings were capped. However, rehabilitation work is not yet completed at all sites, the in situ leaching mine Koenigstein is not flooded and most of the sites which were abandoned in the time period 1957 to 1960 are still waiting for rehabilitation since WISMUT was instructed to work only on those sites which were in operation when the wall came down. Although rehabilitation was done according to technical standards, however, long term stability of slopes and barrier concepts seems to be an open question and requires future research.