

IMWA 2016

Mid-Conference Tour 3

Challenges of water management in the context of uranium mine closure in Eastern Thuringia

1. Introduction

The East Thuringian uranium mining region is located approximately 70 km south of Leipzig within the catchment area of the Weiße Elster, a first-order water body in the Elbe/Saale river system. Since the early 1950s significant uranium mining developed at Ronneburg and Seelingstädt, comprising both underground and open pit operations. In 1960, the largest uranium processing plant in Europe was commissioned at the Seelingstädt site. By 1990, approximately 123 kt of uranium had been produced from the East Thuringian uranium deposits. Since 1991 the uranium mining legacies are under remediation. Main activities comprise the closure and flooding of the Ronneburg underground mine, the backfilling of the former Lichtenberg open pit as well as the stabilization and covering of waste rock dumps and tailings management facilities. While physical remedial work is to a large extent complete, long-term water management will continue to require the provisions of considerable funds.

The field trip will familiarize the participants with the recent remediation status of the uranium mining legacies in East Thuringia paying particular attention to the challenges in the context of mine and seepage water management.

The tour comprises the inspection of water collection systems, remediated areas – amongst others the backfilled Lichtenberg open pit– as well as the water treatment plant (WTP) at the Ronneburg site. At Seelingstädt the remediation technology for the tailings management facilities and the treatment approach for pore and seepage waters in the local WTP will be presented.

On the way back, integral requirements for the ecological monitoring operated in relation to the discharges from the mining areas will be explained at a monitoring station at the Weiße Elster river receiving stream of.

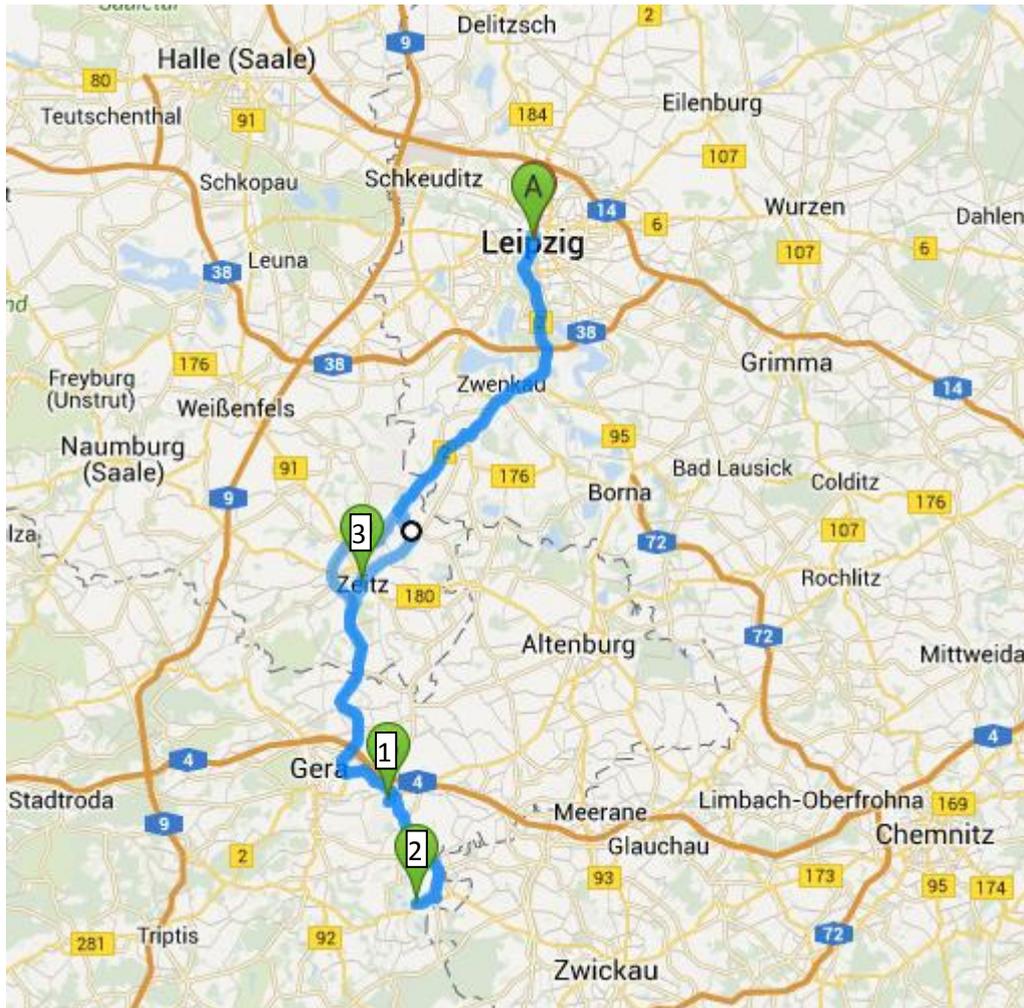


Figure 1 Excursion route (1-Ronneburg site, 2-Seelingstädt site, 3-Ecological monitoring at the Weiße Elster river)

2. Ronneburg remediation area

At the Ronneburg remediation site, the complex underground mine with a volume of approximately 22 Mm³ was flooded between 1998 and 2006. Beforehand, 38 shafts had to be backfilled, near-surface mine structures were stabilized and several hydraulic barriers within the mine had to be constructed. Between 1990 and 2008, 126 Mm³ of contaminated waste rock and further remediation material were relocated to the mined-out Lichtenberg open pit. To date, about 215 ha of the resulting backfill body have been covered with a two-layer soil cover and re-vegetated. The Schmirchau viewpoint on top of the backfill represents a clearly visible landscape structure remembering the mining tradition of the region. Besides mine remediation and pit backfilling, the clean-up of the former operational areas is an essential remediation task, which is not completely finished yet. Collection and treatment of contaminated mine water needs to be ensured as a long-term task.



Figure 2 Backfilled former Lichtenberg open pit mine at the Ronneburg site, with the so-called Schmirchau viewpoint on top

3. Seelingstädt remediation area

Between 1960 and 1990, ores from the Thuringian mining district were hydrometallurgically processed at the Seelingstädt mill. The tailings were disposed of in former mined-out open pits at Trünzig and Culmitzsch. Since 1990 those tailings management facilities (TMF) containing about 100 Mm³ tailings are being remediated, comprising interim covering, geotechnical stabilization, reshaping and cover construction. Currently, different work steps are visible at the individual sub-facilities, by which the stabilization technology for the tailings ponds will be represented. An essential part of the remedial work comprises the management of contaminated pore and seepage waters, which also represents a precondition for geotechnical stabilization measures.



Figure 3 Culmitzsch TMF, safe encapsulation of the tailings (16.11.2015_MG_2031.jpg)

4. Ecological monitoring at the Weiße Elster river

One key objective of the remediation of the former uranium production sites is a significant reduction of the contaminant release into the environment over the long-term, especially into the surrounding receiving streams. In part, distinctly larger amounts of contaminated water accumulate during remediation, which have to be treated and discharged. The impacts of these discharges were observed in the frame of a continuous monitoring at the actual sites and beyond further downstream within a larger catchment area. In order to investigate the impact especially of the discharged salt load on the biological conditions in the Weiße Elster river, a corresponding special monitoring program is carried out.



Figure 4 *Measuring profile at the Weiße Elster river near Zeitz*