

Mid Conference Excursion
Excursion 2

Drainage-Water Management of Potash Mine Dumps in North Thuringia

Introduction

In North Thuringia (Southern Harz Potash District), six mines produced potash salt from the Zechstein formation (Upper Permian). In 1993 the last mine closed in Bischofferode. Six potash mine dumps are now legacy of the potash mining. These dumps are sources of highly saline drainage water (chloride 120 – 150 g/L).

As a form of Private Public Partnership, five dumps and three of the mines were privatized in the end of 90s. The private companies are responsible for remediation of the dumps by covering them and for the mines by filling them with utilizable waste. The state-owned company Lausitz and Central-German Mining Administration Company (LMBV), however, is responsible for disposition of the drainage water.

From three of these dumps 750'000 m³ drainage water per year with a load of 98'000 t chloride are collected in a drainage water collecting basin (DWCB Wipperdorf). From this pool the highly concentrated drainage water is disposed into river Wipper. This disposition of drainage water has to be regulated to a maximum permissible value of 1.5 g/L chloride at the downstream gauge Hachelbich (Fig. 1). Due to the already high background concentration in the Wipper and restricted concentration criteria an automatic control system was developed. This is based on a monitoring gauge network, the outlet construction and the control software which are all connected with a central data base.

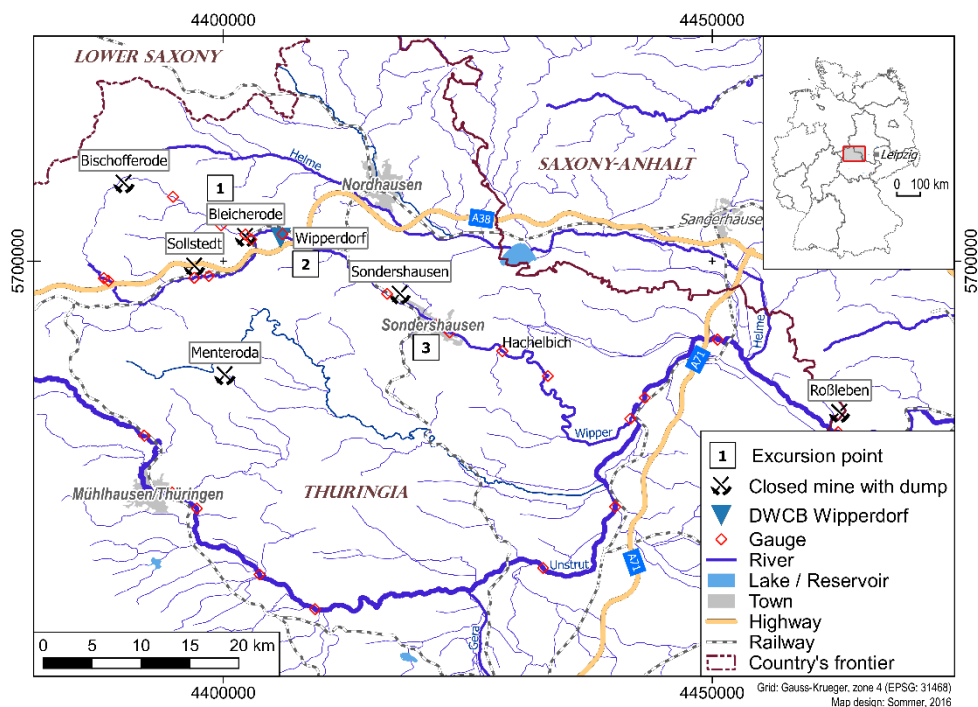


Fig. 1: Map of Southern Harz Potash District

Objective of the excursion is an overview of the drainage water management. We will see three steps of the management. At first we visit the potash mine dump **Bleicherode** – one source of dump drainage water – that will be covered with utilizable waste and soil. With the covering the amount of released dump drainage water will be reduced. Secondly, we will visit the drainage water collecting basin in **Wipperdorf**. There we will see the technical system (hardware) of the drainage water regulation. At last we visit the control center in the office of LMBV in **Sondershausen**. There the software of the drainage water control system will be demonstrated. We are looking forward to a lively concluding discussion here.

1. Point: Potash Mine Dump Bleicherode – dump covering and collection of drainage water

At the potash dump Bleicherode we are at the source of dump drainage water. During its passage through the porous shell of the dump cover, most part of the drainage water is directed into a drainage water ditch. The remaining part infiltrates into groundwater.

The covering of the dump is an efficient way to reduce the amount of dump drainage water. Utilizable waste and soil are convenient materials for covering (Fig. 2).

In a last step the dump will be reforested. This will increase the evapotranspiration and further reduce the infiltration. On the Bleicherode potash dump we visit the two-layer-system of covering. We can also see developed parts of the recultivated dump. In this way we get a fine overview over the whole development from an uncoated to a finally designed potash mine dump.



Fig. 2: Covering of dump Bleicherode (Foto: NDHE)

2. Drainage water collecting basin Wipperdorf

Next step in the management of dump drainage water is the collection in a drainage water basin. We visit the basin in Wipperdorf (Fig. 3). It has a capacity of around 700'000 m³. Dump drainage water from three potash dumps (Bleicherode, Sollstedt and Bischofferode) are collected here. In future drainage water from the Menteroda dump will also be led into the Wipperdorf basin.



Fig. 3: Drainage water collecting basin Wipperdorf

From 2012 to 2014 the basin was reconstructed. It got a new impervious basic layer and new gate valves at the outlet to the river Wipper. The discharge through these gate valves is calculated by the control software.

3. Sondershausen – control system center

The headquarters of division Kali – Spat – Erz of the LMBV Company is situated in Sondershausen, in a former potash mine shaft house. From here the dump drainage water can be regulated with the control software. Goal of dump drainage water management is the compliance of maximum

permissible value of 1.5 g/L chloride at the gauge Hachelbich, connected with a maximum flow rate of dump drainage water from the basin Wipperdorf. Input data for the control system are measured values that are centrally stored in a data base. Measurements cover flow rate and chloride concentration at gauges in the upstream sections of the river system and from the downstream control gauge Wipperdorf as well as the fill level and chloride concentration of the basin Wipperdorf. The chloride concentration and the annual cumulative load of chloride at the further downstream gauge Hachelbich are regulating parameters for the control system. In Sondershausen the software-based control system will be demonstrated (Fig. 4).

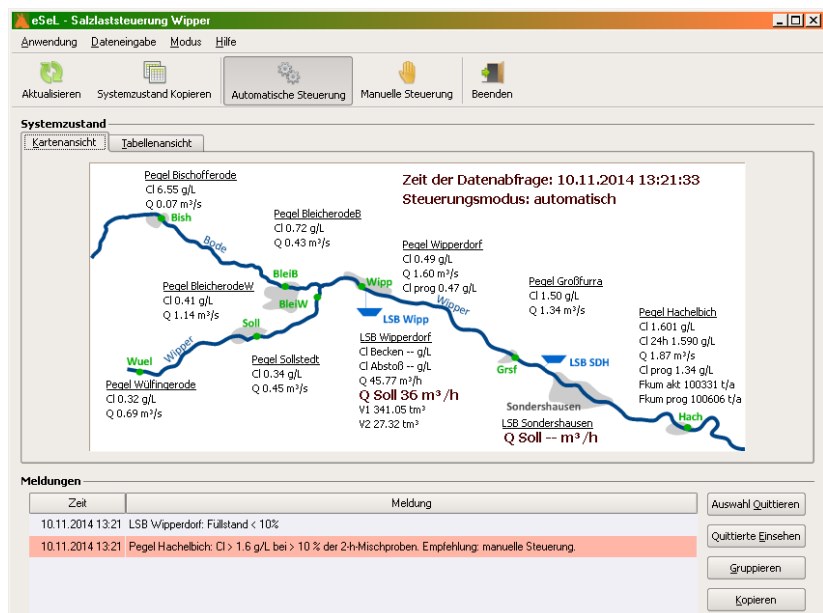


Fig. 4: GUI of drainage water control system