

## Water management in mining and remediation areas in the Weiße Elster basin

### Point 1: Flood Water Discharge Unit

The lake Zwenkau arised in a former open-cast mine pit and has a reservoir for floodwater retention of 18 Mio m<sup>3</sup>.

It was used first in summer 2013 to protect the city of Leipzig from flooding damages by the river Weisse Elster. A flood discharge unit at the northwest edge of the lake enables to discharge back the floodwater into the Weisse Elster in short times. The plant consists of an intake and a discharge construction with vertical steel gates and is situated in between a 450 m connecting channel of the lake to the river Weiße Elster.

### Point 2: In-Lake Neutralization Plant

In 2011 an In-Lake Neutralization Plant was transferred to the shore of Lake Zwenkau. There are two silos for unhydrated lime (CaO), 50 t of capacity each.

The first step of neutralization is slaking the lime with drainage water from the mine Profen nearby. The next step, the suspension is diluted to 1 to 2 mg/l and then pumped into the lake. In June 2015, the plant was temporary shut down. The total input of burnt lime during the neutralization process was about 25.000 t.

### Point 3: Harbor of the city Zwenkau (KAP Zwenkau)

The Harbour is located in the north of the city Zwenkau. The wide area offers a boardwalk, parks, restaurants, shops and a marina. Close to the marina apartment and office buildings will be constructed. Besides the private marina with 200 berths, there are docks for boat building, boat rental etc in the eastern part of the harbour. Another attraction for tourism is the excursion boat MS "Santa Barbara", which offers trips on Lake Zwenkau.

### Point 4: Pavilion at KAP Zwenkau

The pavilion at KAP Zwenkau is a popular sightseeing point. It was opened in 2006. The architecture of the building is a reminiscence to a overburden conveyor bridge. Inside the pavilion, there is an exhibition of the history of mining of the area. Outside there are more objects of mining and a replica of a mine shaft. Furthermore the pavilion has a floor for events and a terrace with a panorama view over Lake Zwenkau and the skyline of Leipzig.

### Point 5: Mine Water Treatment Plant Schleenhain

The mine water treatment plant Schleenhain is situated in the northeast of the open-cast mining pit Vereinigtes Schleenhain. Its treatment capacity is up to 60 m<sup>3</sup>/min. Adding Lime and oxygen to the drainage water effects in increase of pH to the neutral range and lowering of dissolved iron down to 3 mg/l. Finally the treated water is discharged to the river Pleisse. Moreover, the entire drainage system of 250 wells and several pumping stations of the open-cast mines Schleenhain and Profen are controlled by the plant.

### Point 6: Drainage Water Treatment

The final water level of Lake Haselbach was reached in 2002. It must be supported till 2050 to compensate exfiltration losses to the Schleenhain pit system. Since 2011 a vertical well gallery pumps groundwater from deep aquifers with a capacity of 4,5 m<sup>3</sup>/min.

The netto-alkaline groundwater is anoxic and contains high concentrations of iron and inorganic carbon. As a treatment step, pumped water it is sprayed into the feeding channel to Lake Haselbach increasing the pH and the concentration of dissolved oxygen. As the water flows through the feeding channel the iron precipitates are retained in sediments and netto-alkaline groundwater with low concentration of iron discharges into the lake.

### Point 7: Lake Haselbach

After the shutdown of mining in 1977 and a following natural groundwater upcoming the hollow

mould of the open-cast mine Haselbach was finally flooded between 1993 and 2002 with drainage water from the open-cast mine Schleenhain. The lake has a surface area of 3,4 km<sup>2</sup> and a volume of 24 Mio m<sup>3</sup>.

The recreation area has two beaches and spots for fishing. Local clubs offer different activities like diving, surfing and sailing.