



## **Modelling of hydrogeological Conditions surrounding ferruginous sludge Dump during Hydropower plant Sered – Hlohovec Construction**

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In this work is described an actual situation on controlled ecological dump located near Šulekovo, part of Hlohovec City in Slovakia. In this waste dump is stored industrial iron sludge from the Drôtovňa (Wireworks) Inc. Hlohovec. The body of the dump is situated on the right bank of Váh river, 30 m from the protection dam crest axis. Actual dump originally had a hydraulic dump character. In 1993 the underground cut-off walls are built around the circuit of the dump and together with the clays in its basement create an impermeable box, which isolates deposited waste from the surrounding rock environment.

In the past the contamination has evaporated in the surrounding environment and now it is gradually washed by the influence of ground flow. The recent water quality monitoring in the surroundings of the dump sanctions that 10 years after the underground cut-off walls building the environment of the dump is still contaminated. The main signs of the water contamination are high mineralization (conductivity), increased total iron contents, changes of sensorial properties of surface and ground water (iron smell, rusty sediment, greasy surface).

The main factor influencing the contamination cloud movement is the ground water flow direction. The hydrogeological conditions of the region allow the groundwater – stream communication. The groundwater flow direction is conditioned by the Váh river level regime.

In future is planned in this place Hydropower plant Sered' -Hlohovec on Váh river. This hydropower plant will influence the Váh river level regime and therefore movements of contamination cloud too.

The aim of the thesis was to determinate direction of ground water convection, to evaluate an actual influence of the waste dump on groundwater and surface water quality in its environment and to try to simulate a situation in environment during hydropower plant Sered' -Hlohovec running. Data used for analyses was obtained from field survey.

In the work are defined Váh flow conditions, which must be fulfilled to allow the groundwater flow in direction from Váh to land. The groundwater contamination trend near the dumpsite in conditions of the planned hydropower plants construction was simulated upon the hydrogeological measurements in boreholes during the Váh river flood stages. We might suppose that the contamination would be gradually washed in the direction of groundwater flow during the hydropower plant construction. The reach of the contamination wash will depend mainly on the hydropower plant level regime.

Climatic and hydrogeological data diagrams, hydroisohyps maps, hydrogeological cross-sections, impermeable basement isoline maps and map of the ground-water contamination extent around the iron slag waste dump were helped to the reach of this work.