

Mine waters in the Czech Republic – Current situation and trend development

Vladimír Slivka^a, Jiří Vidlář^a, Jan Thomas^{b*}

^aFaculty of Mining and Geology, ^bInstitute of Environmental Engineering, VŠB – Technical University of Ostrava, 17. Listopadu 15, CZ-708 33 Ostrava-Poruba, Czech Republic
Tel. +420 597329391; Fax +420 596 918 589; email: jan.thomas@vsb.cz

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ABSTRACT

In the Czech Republic are mine waters well defined by Directives No. 254/2001 and No. 44/1988. Pumped mine waters from strip or underground mines are affected by increased volumes of iron cations, manganese cations, sulphates anions, acid carbonates and by acid pH. Excess limit volumes of dissolved solids are typical. The concentration of characterised pollution of mine waters does not allow direct discharge of these waters into the surface waters, not even their utilization without previous modification or treatment. Mine waters treatment technology on particular localities could be characterised as mechanical–chemical processes, including processes of solid matter sedimentation and further neutralization. This procedure ensures quality of treated waters for its discharge into the surface waters almost in all limited parameters of pollution. Exception is formed by excess limit concentration of dissolved solids (over 1,000 mg/l) and excess limit concentration of sulphates (over 300 mg/l). Chemical desulphuration processes represented by precipitation are advantageous methods with regards to realization possibilities and costs. Therefore, at the Faculty of Mining and Geology, VŠB-TU Ostrava, the fundamental attention was devoted to applications combining natural friendly calcic and aluminic ions that ensure reliable removal of sulphates. As the most suitable processes of current mine waters treatment appear to be tertiary processes, especially membrane technologies which are situated behind very effective pre-treatment removing solid particles. Membrane technologies could be used in procedure of final treatment as an advanced technology, which provide both demineralized water (permeate) and saline concentrate. Both products are for further commercial utilization.

Keywords: Mine waters; Desulphation; Open strip; Mine; Sulphates; Desalination; Membrane technologies

* Corresponding author.