

## Abstract

This master's thesis is focused on remediation of groundwater polluted by chlorinated ethenes with a use of nanoiron particles. Three injections of different types of nanoiron were carried out in the contaminated area of Spolchemie a.s. company in Ústí nad Labem. The main aim of the thesis was to compare effectiveness of those three applications. The remediation of groundwater was done by direct-push injection of suspension of nanoscale zero-valent iron. After that a monitoring of groundwater level and physicochemical parameters was performed. Samples of groundwater were collected during the monitoring and were analysed for contaminants and products of dechlorination. It was discovered that NANOFER STAR nanoiron had the strongest influence on reductive dechlorination. This was reflected by concentration decrease of TCE by 84 %, VC by 60 % and total concentration of CHC by 39 % in the period three months after the injection and the increase of degradation products of chlorinated ethenes. Injections of conservative tracers potassium bromide and lithium chloride served as a criterion for differentiation between the process of dechlorination and simple dilution effect. The effectiveness of NZVI-C3 nanoiron and NANOFER STAR with CMC nanoiron were notably lower than the bare NANOFER STAR nanoiron. In the theoretical part of the thesis the contamination by chlorinated ethenes, properties of nanoiron, its preparation and stabilization, *in situ* chemical reduction by nanoiron, natural conditions at the Spolchemie site, previous works on the pilot test area and a methodology of works are described.