

Full scale amendment of a contaminated wood impregnation site with iron water treatment residues - DTU Orbit (09/11/2017)

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Iron water treatment residues (Fe-WTR) are a free by-product of the treatment of drinking water with high concentration of iron oxides and potential for arsenic sorption. This paper aims at applying Fe-WTR to a contaminated site, measuring the reduction in contaminant leaching, and discussing the design of delivery and mixing strategy for soil stabilization at field scale and present a cost-effective method of soil mixing by common contractor machinery. Soil contaminated by As, Cr, and Cu at an abandoned wood impregnation site was amended with 0.22% (dw) Fe-WTR. To evaluate the full scale amendment a 100 m² test site and a control site (without amendment) were monitored for 14 months. Also soil analysis of Fe to evaluate the degree of soil and Fe-WTR mixing was done. Stabilization with Fe-WTR had a significant effect on leachable contaminants, reducing pore water As by 93%, Cu by 91% and Cr by 95% in the upper samplers. Dosage and mixing of Fe-WTR in the soil proved to be difficult in the deeper part of the field, and pore water concentrations of arsenic was generally higher. Despite water logged conditions no increase in dissolved iron or arsenic was observed in the amended soil. Our field scale amendment of contaminated soil was overall successful in decreasing leaching of As, Cr and Cu. With minor improvements in the mixing and delivery strategy, this stabilization method is suggested for use in cases, where leaching of Cu, Cr and As constitutes a risk for groundwater and freshwater.

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