



EXAMPLES FROM THE GREENLAND-PROJECT - GENTLE REMEDIATION OPTIONES (GROs) ON PB/ZN CONTAMINATED SITES

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The GREENLAND-project brought together “best practice” examples of several field applied gentle remediation techniques (EUF7-project “Gentle remediation of trace element-contaminated land – GREENLAND; www.greenland-project.eu) with 17 partners from 11 countries. Gentle remediation options (GRO) comprise environmentally friendly technologies that have little or no negative impact on the soil. The main technologies are

- phytoextraction
- in situ immobilization and
- assisted phytostabilization.

Mining and processing activities affecting many sites worldwide negatively. The huge amounts of moved and treated materials have led to considerable flows of wastes and emissions. Alongside the many advantages of processed ores to our society, adverse effects in nature and risks for the environment and human health are observed.

Three stages of impact of Pb/Zn-ore-treatment on the environment are discussed here:

(1) On sites where the ores are mined impacts are the result of crushing, grinding, concentrating activities, and where additionally parts of the installations remain after abandoning the mine, as well as by the massive amounts of remaining deposits or wastes (mine tailings).

(2) On sites where smelting and processing takes place, depending on the process (Welz, Doerschel) different waste materials are deposited. The Welz process waste generally contains less Cd and Pb than the Doerschel process waste which additionally shows higher water- extractable metals.

(3) On sites close to the emitting source metal contamination can be found in areas for housing, gardening, and agricultural use. Emissions consist mainly from oxides and sulfides (Zn, Cd), sulfates (Zn, Pb, and Cd), chlorides (Pb) and carbonates (Cd).

All these wastes and emissions pose potential risks of dispersion of pollutants into the food chain due to erosion (wind, water), leaching and the transfer into feeding stuff and food crops.

In-situ treatments have the potential for improving the situation on site and will be shown by means of field experiments in Spain, Poland and Austria.

Keywords: Mining and smelting, in-situ remediation, phytomanagement, gentle remediation options