

## Nassfeld, Gasteinertal - the remnants of gold mining

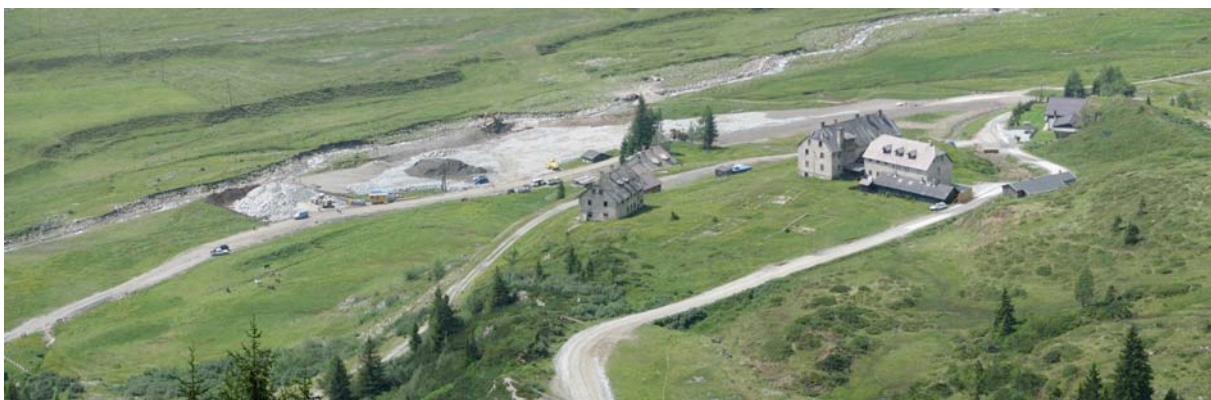
Within the years 1990 to 1998 the Department for Environmental Protection (Office of the Regional Government of Salzburg) completed a project to identify and assess the environmental impacts of abandoned mining locations in the Region of Salzburg. Mainly mining and processing sites for non-ferrous heavy metals have been covered, as their residues (waste rocks, gangue material, especially waste materials of metallurgic processing) are often contaminated with arsenic and heavy metals.

The former mill in Nassfeld served as a processing plant for precious metal ores mainly from the Rathaus mountain south of Böckstein in the vicinity of the National Park Hohe Tauern, at the southern border of the valley of Gastein. To enable the metallurgic extraction of gold and silver it was necessary to prepare pulverized and enriched ore concentrates. The residues of the mineral processing have been discarded beside the mill's waste water ditch near the Siglitz creek. The remaining sludge resembled light yellow, in part blueish sand. The flotation sands contained up to 16,7 grams of arsenic per kg, and up to 50 mg/kg Cd, up to 32 mg/kg Hg and up to 7.500 mg/kg Pb with high leaching rates. The topsoil in the vicinity showed increased heavy metal and arsenic concentrations, too.

An area of app. 10.000 m<sup>2</sup> was identified, where the contamination of the surface by dumped sludge and its effluents was so high that immediate action had to be taken. Although located at a high altitude, the site is open to the public and has been used as a pasture mainly for horses during summer, and as a location for biathlon events during winter.

The high metal content of the sludge prevented the formation of a stabilizing grass covering.

Aims of the remediation measures have been to stop further spreading of heavy metal loaded material by leachate or suspension, prevent any erosion of the area, stop access to polluted soil, restore a grass planting corresponding to the existing vegetation and to preserve the special scenic character of the area in the vicinity of the National Park.



To reach the safeguarding and recultivation aims, a final cover was applied, consisting of a barrier layer of soil with a high clay content, a protective and drainage layer, topped by soil material corresponding to the location, integrating water gutters and little ditches to minimize surface water influence. A selective embankment safeguarding in the area of the Siglitz torrent was added to ensure the durability of the measures. The final recultivation aimed at the restoration of the typical, small structured pastures.