

# Restoration and Extension of the Runway at the US-Air Base Ramstein with Sump Drainage and Water Treatment



BAUERUmweltgruppe

<b>Client:</b>	LBB Niederlassung, Landau, Germany
<b>Engineering Design and Supervision:</b>	igr AG, Rockenhausen
<b>Scope of work:</b>	Design, Construction and Operation of a Groundwater Treatment Plant containing Sedimentation, Filtration and Adsorption
<b>Contract Period:</b>	April 2004 to October 2005



### Project

Groundwater contamination with BTEX, PAH, halogenated VOC and iron at the US-Airbase in Ramstein, Germany, required the installation of a groundwater treatment plant during the restoration and extension works of the local runway.

### Remediation Site

The treatment plant was designed with a maximum flow capacity of 72 m<sup>3</sup>/h. Due to variations in the groundwater quality alterations in the plant design had to be considered. Therefore a flexible plant was built with optional units.



*Fine particular matter and bound PAH are removed by the multi media filters. Consequently the lifespan of the activated carbon filters increases.*

### Result

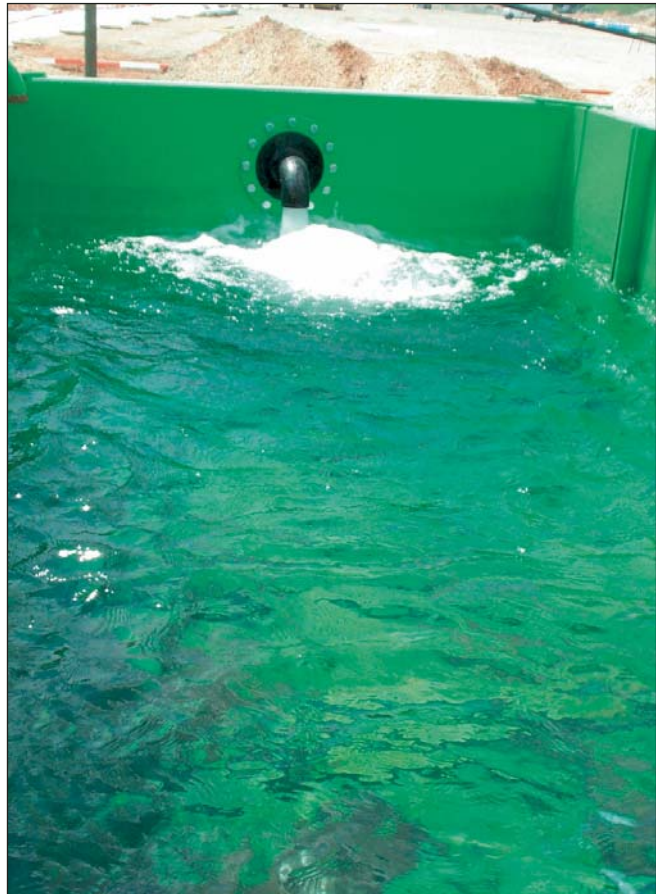
Water intake and supply for the plant was carried out by the construction company employed for the runway works. In case of any malfunction of the treatment plant the water pumps will be automatically shut off.

In the first treatment step the water runs through a pre-settling unit and a coalescent unit to separate solid matter and low density non-aqueous phase. Then the water is deviated into redundant basins to produce a potential gradient and further into the iron removal unit.

Dissolved and colloidal substances are oxidised and removed by using oxygen and proportional chemical feed (coagulant, flocculant) carried out in a flocculation reactor. The produced sludge is separated by an inclined tube settler. The pre-treated water is then lead through parallel multi media filters with automatic back-washing and a sequence of two activated carbon filters.

Fine particular matter is removed by the multi media filters and as a positive effect the PAH bound to the particular matter as well. Consequently the lifespan of the activated carbon filters increases. The remaining contaminants are removed by adsorption in the activated carbon filters. After that the treated water is discharged into the river regarding the given restrictions by law.

An automatic failure warn-system is installed to guarantee the continuous availability of the plant. In case of malfunction the system transfers the necessary information to the plant supervisor via SMS. Thus short term maintenance is ensured.



*The average groundwater flow through the plant was 25 – 30 m<sup>3</sup>/h. The treated water is discharged into the river.*