

**EXAMINATIONS OF THE AVAILABILITY OF SUBSOIL WATER IN CENTRAL
BURGENLAND (DISTRICT OF OBERPULLENDORF) UNDER SPECIAL CONSIDERATION
OF RENEWAL, DYNAMICS AND QUALITY OF WATERS AND INCLUDING THE
SURVEILLANCE OF EXISTING PROTECTED AND PRESERVED AREAS
"EXPLOITABLE SUBSOIL AQUIFEROUS SEDIMENTS IN CENTRAL BURGENLAND"**

by

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The present study entitled "Exploitable Subsoil Aquiferous Sediments in Central Burgenland" provides a compiled survey of the "water situation" in Central Burgenland, placing strong emphasis on the availability of subsoil water, under special consideration of renewal, dynamics and quality of waters and including the surveillance of existing protected and preserved areas.

The general geotectonic basin structure of the project area, confined by ridges of crystalline hills towards the north, the west and the south, shows an eastward incline and thus a principal direction of the underground water current. Therefore the tertiary stratifications enclosing the basin may be described as main groundwater renewal areas (recharging area). The generally fine-grained consistency of the Pannonian sediments near the surface in the inside of the basin does not allow for large-scale groundwater renewal.

On the basis of the locally divergent tectonic and sedimentological conditions in the basin, one may take for granted a generally limited groundwater communication. However, the possibility of a limited influx of formation-relevant waters from lowlying strata of the Minor Hungarian Lowlands cannot be dismissed.

In the crystalline areas surrounding the basin the subsoil water flow is characterized, on account of segmentation and a not too significant weathering layer of crystalline, by springs with a strongly fluctuating and rather poor water output (< 1 l/s) which is clearly influenced by precipitation. In particular with respect to the mineral and therapeutic water deposits (Deutschkreutz, Kobersdorf, Piringsdorf, Lutzmannsburg) the tectonic development of the Oberpullendorf Basin plays an important role. The general direction of the current of the main drainage channels shows the impact of a north-westerly - south-easterly interference system which, like a younger north-easterly - south-westerly interference system, is responsible for the rising of mineralized waters from low-lying strata.

Isotope geophysical examinations of these waters showed partly meteoric subsoil waters influenced by the ice age.

The other groundwaters from Pannonic and secondary Sarmatic aquifers, which were used for the drinking water supply and examined, showed very distinct ages, generally from post-glacial times.

The subsoil aquiferous gravel and sand horizons show, like quarternary valley sediments, a medium permeability of between $1 \cdot 10^{-4}$ and $1 \cdot 10^{-6}$ m/s at output rates of up to 25 l/s (well 4, Neckenmarkt).

Hydrogeochemical examinations of subsoil and surface waters revealed geogenous as well as anthropogenous influences. While waters which are exclusively characterized by minerals resulting from geogenous processes usually indicate lowerlying groundwater systems with longer residual times, hydrochemical parameters caused by anthropogenous events rather indicate circulation systems immediately influenced by meteoric activity. Thus the hydrogeochemical characteristics of the individual groundwaters could be taken, in a limited way, as differentiation criteria for the delimitation of different aquifers.

By carrying out numerous geoelectrical depth soundings, potential areas of exploitable subsoil aquiferous sediments on the surface and down to a limited depth could be delimited, which resulted in borings for the exploitation of drinking water in Oberpullendorf and St. Martin/Landsee.

On the one hand, reflexion seismic tests confirmed the general complexity of the sedimentologic-tectonic development of basins and their limited regional significance, on the other hand they signified the presence of potential lower-lying groundwater bodies which are mostly dependent on local sedimentary layers of previous river systems (delta sediments at the edge of the basin, sediments filling watercourses) and frequently overlaid by fine-grained layer horizons. The results obtained from the reflexion seismic tests led to the establishment of locations for potential borings for drinking water exploitation (Deutsch Gerisdorf, Steinberg, Kroatisch Gerisdorf) and to the elaboration of a proposal for the limitation of the existing groundwater preservation area 'Central Burgenland'.

On account of the geotectonic complexity and the different groundwaterdynamic structural conditions caused by it, hydrodynamic pilot projections for drawing up a groundwater balance could be developed only in an approximate way. The average groundwater renewal rate for the entire project area, which was determined in the course of tests, is, including the eastern parts of the test area which are characterized by a negative water balance, approximately 120 to 130 mm/a. As opposed to this, the present average total annual consumption is about 2,660,000 m³, corresponding to about 84 l/s or an average daily consumption per person of about 183 l. Therefore for the project area which, compared to the Austrian average, is characterized by a considerably lower amount of precipitation, resp., groundwater renewal, particularly careful water conservation planning in dealing with the limited water resources is necessary.

The great number of data obtained in the course of the project require the employment of a Geographic Information System (ArcView). Therefore the group responsible for the project was entrusted with the entire project in digital form, in order to ensure an uninterrupted continuation of data collection and thus to maintain up-to-date water conservation data for the sustained and guaranteed drinking water supply for Central Burgenland.