GeneSys Doublet: setup and test of a geothermal well doublet in Lower Cretaceous sandstones of northern Germany – an outlook.

André Stechern, Tischner Torsten, and Bernhard Prevedel
Federal Institute for Geosciences and Natural Resources (BGR), B3.1 Subsurface use, Hannover, Germany (andre.stechern@bgr.de)

The Federal Institute for Geosciences and Natural Resources (BGR) has drilled the approx. 3,900m deep geothermal well Groß Buchholz Gt1 as part of the GeneSys geothermal project. The Bunter sandstone (Lower Triassic) was initially recovered as the target formation for the borehole. Due to the difficult geological conditions found, it was decided to abandon the Bunter sandstones. It is now intended to heat the properties of the GEOZENTRUM Hannover (GZH) using a geothermal doublet. In addition to the direct benefit for the GZH from the utilization of this regenerative energy source and the associated relief for the environment, the demonstration of the use of multiple, low thickness sandstone layers is of particular importance in this project. It should be proven that the sandstones of the Wealden formation (Lower Cretaceous / Berriasian) at a depth of approximately 1200m are suitable for geothermal usage. Moreover, a reference site for locations with similar geological conditions will be created.

As a requirement for further technical work in the borehole, a bottom cementation will be carried out at the final depth of the wellbore. This seals the perforation at a depth of approx. 3,700m and the access to the Bunter sandstones. A sidetrack is then drilled out of the existing hole into the Wealden sandstones. For this, a window is milled at a depth of approx. 750m and the sidetrack is drilled down to a depth of approx. 1300m. The determination of the landing point of the sidetrack is the subject of current investigations, as the Wealden sandstones are spatially heterogeneous. The reinterpretation of existing seismic profiles is of great importance for this. After successful completion of the sidetrack and evaluating the production tests and after a successful production test a second well is drilled from the samedrilling site to a target depth of approx. 1300 m. The calculated distance of the two holes at the target depth is approx. 500 m.

In the previous project, the sandstone layers of the Lower Cretaceous were examined for their suitability for geothermal use. A maximum expected transmissibility can be estimated from the sum of six suitable sandstone units (total 46m), as well as the average permeability of these units of approx. 75mD. This results in a maximum transmissibility to be expected of approx. 3.5Dm. The measured temperature at a depth of 1200m is exceptionally high with 69°C.

In order to further increase the productivity of the drilling, it is planned to open up or stimulate the target horizons with different drilling techniques: for example, radial jet drilling and / or acid stimulation.