Donnerstag, 29. Februar 2024, 15.30 Uhr
Baden Arena Kongress 1 – Tiefe Geothermie

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Baden Arena Congress 1 – Deep Geothermal Energy

A world's first geosteering application in Geothermal

Die weltweit erste Geosteering-Anwendung in der Geothermie

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The Paris Basin is the largest geothermal district heating market in the world, with over 250,000 homes heated with geo-energy. However, further development of this resource is facing an uphill battle to deploy new heating plants in areas with sub-optimal reservoir properties and limited surface locations to locate geothermal plants. Drilling horizontal geothermal wells reduces the impact of drilling operations in densely populated urban areas. In this basin, there is also an East-West divide of good reservoir properties. The East has higher permeabilities and substantially more developments. And the best flow characteristics come from thin layers, which should be targeted to enhance heat recovery.

A service company in a recent collaboration with a Geothermal operator has addressed the challenge of placing a horizontal doublet in thin permeable layers, using Logging While Drilling (LWD) deep electromagnetic multi bed boundary mapping and borehole imaging technologies, combined with an 8.5 x 9.5" rotary steerable (RSS) drilling BHA. After identifying the main permeable layers with a pilot hole and production logging data, the lateral trajectory was designed to maximize reservoir exposure. The production well was drilled over a length of 850m, in the two most productive layers, with vertical thicknesses typically between 2 and 3m and not exceeding 5m. Accurate steering decisions and swift directional response from the RSS allowed us to follow the formation boundaries by combining geological and petrophysical model update using real time data interpretation. The addition of a fixed Stage Hole opener increased the hole diameter to 9.5", resulting in further production flow rate enhancements. The geosteering outcome were then confirmed by the production logging run giving confidence with the well placement and drilling technologies in the first well. As a result, the pilot hole for the second well was cancelled. It was drilled and geosteered through the reservoir for another 800m lateral.

Such innovative well architecture for a geothermal doublet enabled the generation of approximately 15MW of heating capacity. It provides hot water and heat to residents of about 8,000 homes with renewable energy. This project alone avoids the emission of 15,000 metric tons of CO2 equivalent per year.

This presentation will show the world's first real-time multi-bed boundary mapping application in Geothermal and demonstrate how this new LWD based strategy resulted in doubling the well production, compared with a standard J-type geothermal doublet. Six other wells' prospects have been identified around Paris in which this technology is planned to be deployed again, and other companies in Denmark, the Netherlands and Germany have shown interest to replicate this approach in Europe.