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Panorama Saal EDEKA-Arena Kongress 1 - Tiefe Geothermie

Friday, 3 March 2023, 11.45 am
Panorama Hall EDEKA-Arena congress 1 - Deep Geothermal Energy



Injectivity increased by 385% after Concentric Coiled Tubing Sand Cleanout

Injektivität nach Concentric Coiled Tubing Sand Cleanout um 385% erhöht

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The geothermal injector A, a vertical well with 1233m true depth (TD), is located onshore Denmark. It was completed in 1983 with 40 m of sand screens (depths from 1194m to 1232.3m) and presented a decline in injectivity of approximately 60% in the period from 2011 to 2021. The remedial work for mitigation of this increasing decline has been studied and executed according to the below steps:

Background camera run and diagnosis of decline of injectivity due to sand blocking screens: It was executed in 2020 and found that a column of compacted solids from 1219m to 1233m was filling this sand screens section. Additionally, the sand screens from 1200m to 1219m were partially obstructed by solids.

Study about potential sand cleanout technologies: It was conducted during spring 2022 and planned by WellPerform on behalf of Operator. Several coiled tubing technology suppliers were evaluated in a tender process.

Selection of Concentric Coiled Tubing + Jetting and Vacuuming Technologies: A service company was awarded the intervention because of their unique concentric coiled tubing solution (CCT). The solution enables pumping from a 1" coiled tubing string while taking returns from the annulus between the 1" and 2" string and vice versa. Facilitating the removal of sands from a sub-hydrostatic well as the one being treated. Additional jetting tools and vacuum tools were used with the CCT set-up.

Treatment program design and operation planning: It was a collaboration between CCT Supplier, Jetting Tools Supplier, WellPerform and Operator. It was planned between July 2022 and September 2022.

Operation execution and post Treatment pressure test: The execution was carried from the 4th October to the 11th October 2022 and followed a program containing jetting solution, vacuuming tool, and a consistent Nitrogen lift (N₂) to displace the larger possible amount of solids to surface.

Post-intervention injectivity data and efficiency analysis: An initial injectivity test was run at the end of operation, bringing the well up to 90 m³/h and after 30 minutes settling at 77 m³/h. Being the pre-job injectivity of approx. 20 m³/h, this results in an increase of 385%

Post operation data monitoring and well behavior analysis: At the submission of this abstract, injectivity is constant at approximately 77 m³/h. More detailed information will be available after monitoring the well behavior during the heating season 2022-2023 and available for GeoTHERM Event at Offenburg in March 2023.

Conclusions and mitigation measurements: The intervention was successful in terms of HSE for both personnel and well integrity. Additionally, injectivity was increased by 385% from



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original rates, hence increasing production and general performance of the geothermal district heating system. Downhole returns recovered at surface have been sampled at different stages of the operation and will be subject of various analyses to assess diverse parameters. Furthermore, injectivity, pressures and other parameters will be monitored during the coming months. Results from the above chemical analyses and performance monitoring will determine potential future mitigation measurements.