

Role and Importance of Geosteering in Geothermal Projects

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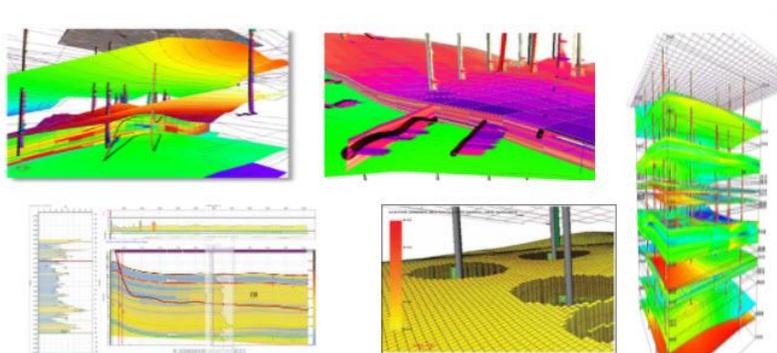
Summary

Geothermal energy has become the next resource of interest as oil and gas producers and governments try to reduce their hydrocarbon and CO₂ footprint. This transition may happen faster than we thought before. This shift is an opportunity to use available and existing oil and gas technology and evolve it into a solution for the next phase of the energy industry. Geothermal resources are a form of energy that through proper evaluation and design would be accessed through old and new wellbores.

There are several geothermal resources, however in this paper we will review hydro-geothermal. This is prevalent in the Western Canadian Sedimentary Basin (WCSB) and other sedimentary basins globally. The heat range is wide, from 50 to 120 degrees C. The challenge is to make the process widely economic through innovation, selection of surface equipment, and processes, to make the schemes work. This paper will discuss the importance of geomodelling and geosteering in relation to hydro-geothermal resource plays.

Theory

Hydro-geothermal plays require mapping and 3D modelling of the potential heat resources, integrating geological, geophysical and engineering data. Through this process, optimal placements are planned and designed in the most porous and permeable rock. Remaining in the best rock properties allow the well to be drilled faster with less geological and drilling issues. A reduction in issues while drilling directly links to reduced cost of a well. Examples will be covered showing the relationship between 3D modelling, improved well planning and reduced well cost.



3D modelling and geosteering in SMART4D, used for well planning and placement in geothermal resource plays.

Geosteering is required to ensure quality placements within the engineered targets with minimal doglegs. The presentation will look at similarities of processes between oil and gas and hydro-geothermals in terms of technology solutions for well schemes. Looping of multiple horizontal wells and schemes that emulate waterfloods with injectors and producers are just two examples.

Conclusions

Mitigation of risk for well placements requires geosteering with 3D geo-models that create an understanding of the multitude of rock properties and help ensure optimal well placements. Processes designed for the oil and gas industry can be adapted, and provide huge value for, geothermal resources.