High-Temperature Formation Pressure-While-Drilling Service Run in China

StethoScope HT service proves formation is not depleted in complex, 170-degC environment

**CHALLENGE**
Obtain formation pressure in relatively low-permeability thin sand of a highly deviated, high-temperature environment.

**SOLUTION**
Implement StethoScope HT* formation pressure-while-drilling service, follow Schlumberger high-temperature procedure, and ensure precise tool positioning.

**RESULTS**
Obtained formation pressure gradient and concluded formation was not depleted.

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**Evaluate suspected formation depletion**
An operator in China suspected formation depletion in a high-temperature, deviated well with a history of wellbore stability issues. The well had a 52° inclination and measured depth of more than 5,000 m, with a static temperature of up to 170 degC [338 degF] and circulating temperature of 140 degC [284 degF].

The well was located in a sandstone reservoir with relatively low permeability between 2 and 20 mD/cP. A formation evaluation in these conditions faced several challenges: specific high-temperature procedures, precise tool positioning for pretests in layers less than 0.5-m thick, battery life management to address accelerating lithium battery consumption in HT, complete tool stability in the BHA to prevent packer and setting piston damage, and no BHA movement during testing for 12–15 minutes to avoid the risk of stuck pipe.

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Formation pressure and mobility of the main target—Zone 1—was found using nine pretests with 100% success rate. Five good pretests showed formation gradient of 1.1, and there were four dry tests.
CASE STUDY: StethoScope HT service proves formation is not depleted in complex, 170-degC environment

Conduct pretests using StethoScope HT tool
The client chose the StethoScope HT formation pressure-while-drilling service as the most economical option to perform a series of nine high-efficiency, TOP* time-optimized pretests, following strict high-temperature procedures and ensuring precise tool positioning in thin layers.

Determined formation pressure and mobility of target zone
The nine pretests were carried out with 100% seal success and completed in only 5 hours, minimizing operational time. There were five good tests with formation gradient of 1.1 and four dry tests resulting from low formation permeability. The tool was successfully operated in HT conditions, and determined the formation pressure gradient of about 1.14 mPa/100 m and the mobility of the main target Zone 1. The fact that the formation was not depleted provided valuable information for future development plans.

Contact your local Schlumberger representative to learn more.