

Innovative Magnetic Ranging Solution Saves Over USD 200,000 on Complex P&A Project

SPERRY DRILLING COMBINES MAGNETIC RANGING SERVICES FOR PRECISE ALIGNMENT OF SIDETRACK AND TARGET WELL

PARIS, FRANCE

CHALLENGES

- » Reenter a leaking geothermal well to complete a complex P&A operation
- » Maintain detection of the target well casing after sidetrack with very few remnants of magnetic signatures
- » Minimize cost by reducing active magnetic ranging runs
- » Optimize alignment for milling and reentry

SOLUTIONS

Engineered drilling solution, using the following combination of magnetic ranging services:

- » WellSpot™ intercept magnetic ranging service to reduce positional uncertainty between the two wellbores
- » Passive Magnetic Ranging (PMR™) service to reduce total number of magnetic ranging runs

RESULTS

- » Reduced uncertainty, enabling correct path to be taken to the interception window
- » Performed at least two fewer runs than estimated to complete interception, saving USD 60,000 per run, along with rig-time costs – in totality, valued at more than USD 200,000
- » Accurately aligned trajectory of drilling well to target casing, and successfully milled a window for reentry for P&A operations
- » Abandoned the well safely and in compliance with environmental regulations

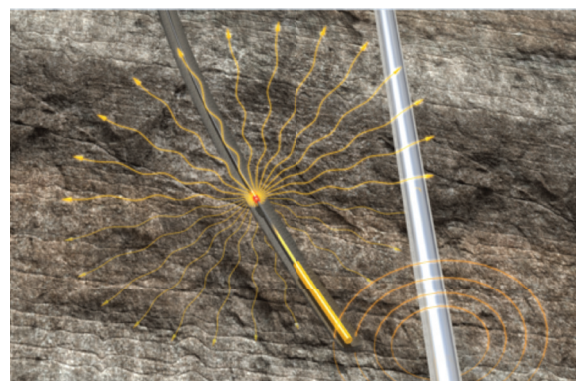
OVERVIEW

An operator with a leaking geothermal well in inner-city Paris, France, was finding it difficult to mill a drillpipe cemented up to approximately 2,782 feet (848 meters) of measured depth (MD) on a complex plug and abandonment (P&A) operation. This well had been completed decades ago and was severely corroded, leaving very few remnants of magnetic signatures, rendering passive magnetic ranging (PMR) insufficient on its own.

Sperry Drilling was selected to accurately steer a sidetrack well, providing precise measurement of distance and direction to the casing of the target well. A specialized Proximity Ranging and Interception team had the expertise for this job, having worked on all types of well interception scenarios. The implementation of not one, but two magnetic ranging systems, both passive and active, delivered greater survey accuracy than conventional techniques. This enabled the operator to overcome previous challenges and efficiently achieve its goal in less than three weeks – leading to successful milling into the geothermal well, while also saving more than USD 200,000 in rig time and ranging run costs.

COMBO SOLUTION IDENTIFIES IDEAL ALIGNMENT BETWEEN WELLBORES

Essentially, the operator could not complete the P&A project because the drillpipe was stuck above the formation zones that needed to be isolated. To properly P&A the well for zonal isolation, cement plugs had to be set below the fish. Multiple attempts were made to first fish out the drillpipe and then mill through it, but these efforts were unsuccessful. After several frustrating, costly months, it was concluded that the most viable option was to sidetrack around the drillpipe, enabling interception and reentry into the original wellbore for setting the cement plugs.



The WellSpot™ intercept magnetic ranging service provides a one-of-a-kind service to help P&A operations.

Sperry Drilling collaborated with the operator to fully understand its unique challenges and requirements, leading to a combined recommendation of the WellSpot™ intercept magnetic ranging service and the Passive Magnetic Ranging (PMR™) service for ranging between the sidetrack well and the target well. Because active access-independent magnetic ranging

techniques do not require deployment of a system into the existing wellbore, it was the right choice for addressing the damaged casing and cemented drillpipe on this project.

Ranging activities began at around 2,800 feet (853 meters) MD, approximately 250 feet (76 meters) after the sidetrack, to confirm the sidetrack drilling results and reduce the positional uncertainty between the two wellbores. Ranging operations continued to be performed periodically to maintain optimal proximity for the interception and milling. At approximately 3,500 feet (1,067 meters) MD, edge-to-edge contact was made with the target well casing at an ideal alignment and incidence angle for milling and reentry.

ADVANTAGES OF COMBINED ACTIVE/PASSIVE RANGING SOLUTION

- » The WellSpot service helped to minimize positional uncertainty between the two wellbores by maintaining measurement of distance and direction to the target well. It also ensured that the operator would obtain the optimal alignment for milling and reentry through its ability to accurately provide distance and direction to the target casing.
- » Typically, passive ranging uses the already present magnetic remnant field on the target well casing to calculate a distance and direction to that target well casing. Although it was not the ideal solution to determine the distance and direction in this case, due to the corroded casing, it was used throughout the well to monitor magnetics and extend drilling intervals between ranging runs. The ability to extend drilling intervals and perform fewer active ranging runs saved the operator time and money.

COMBINED SERVICES ENABLE OPERATOR TO COMPLETE OPERATION IN JUST ONE WELLBORE

This innovative solution – in particular, the high accuracy of the WellSpot service – precisely guided the trajectory of the sidetrack well, completing the operation in a single wellbore. The combined services made it possible for the operator to perform at least two fewer runs than estimated to complete the interception, thus saving approximately USD 60,000

per run, along with rig-time costs – in totality, valued at more than USD 200,000. With a highly accurate alignment of the trajectory of the drilling well to the target casing, the operator was able to successfully mill a window for reentry into the target casing for P&A. These services enabled the operator to finally complete the P&A process on this geothermal well – in a safe and environmentally compliant manner – after months of previous attempts, and maximize the value of the geothermal asset.

**SAVED
OVER
USD 200,000**



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