

North Sea Operator Avoids Drilling Hazards and Maximizes Reservoir Exposure

EARTHSTAR™ ULTRA-DEEP RESISTIVITY SERVICE DELIVERS ADDITIONAL PRODUCIBLE RESERVES

NORTH SEA

CHALLENGE

Staying in zone in difficult North Sea environment, where difficulties included:

- » Considerable seismic uncertainty
- » Undulating surface of reservoir top, making it hard to maintain well position
- » Unstable overlying shale, with high risk of borehole stability problems and stuck pipe

SOLUTION

- » EarthStar™ ultra-deep resistivity service, which maps reservoir and fluid boundaries, combined with RoxC® geosteering software for improved reservoir insight and optimized well placement

RESULTS

- » Geomapping helped operator enhance reservoir understanding and successfully place five production laterals within 20 feet (6 meters) of the top of the reservoir
- » Geosteering helped operator drill a total interval of over 36,000 feet (10 973 meters) while avoiding hazards and maximizing reservoir contact
- » Decreased time to develop the field
- » Increased producible reserves

OVERVIEW

An operator in the North Sea was developing a new oil field, but was finding it difficult to place the reservoir sections of the production wells in the optimal position. The undulating surface of the reservoir top made it hard to maintain the well position high enough in the reservoir while avoiding a reservoir exit. Furthermore, the overlying shale was unstable, so that any exit from the reservoir could potentially lead to a high risk of borehole stability problems and stuck pipe. The operator realized that traditional geosteering technologies were unsuitable for such a challenging environment, since changes in the dip of the reservoir top could not be detected early enough to allow the well to be steered away from them. Halliburton Sperry Drilling recommended the EarthStar™ ultra-deep resistivity service to help the operator avoid unwanted reservoir exits and confidently steer in the zone to access additional pay.



GEOMAPPING FORMATION BOUNDARIES ENHANCES RESERVOIR UNDERSTANDING

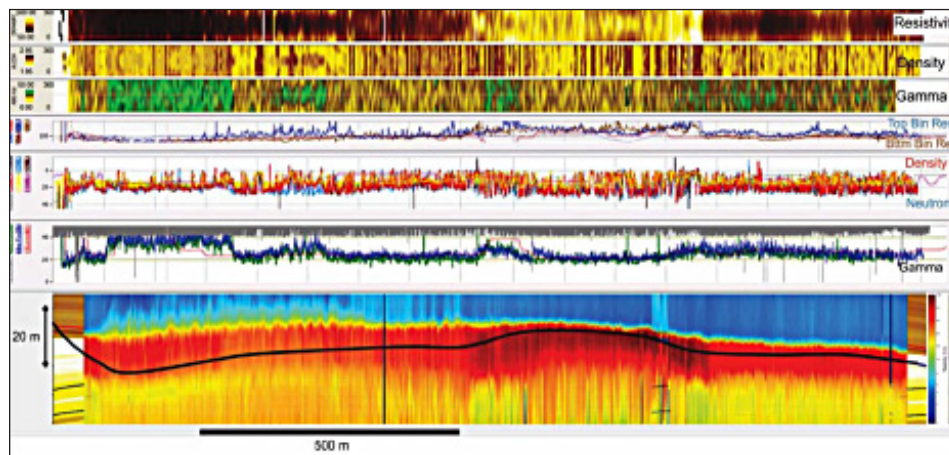
Through geomapping, the EarthStar service can map formation boundaries much farther from the wellbore than the current industry standard – proven up to 225 feet (68 meters) in the right conditions. This capability enhances reservoir understanding and insight. In this case, the operator was able to effectively geomap the reservoir's top surface from a safe distance, which enabled timely trajectory corrections and reduced the risk of exiting the reservoir.

GEOSTEERING EXPERTISE LEADS TO ACCURATE WELL PLACEMENT

Real-time reservoir data, delivered through the proprietary RoxC™ geosteering software, combined with data interpretation and visualization provided by Halliburton Sperry Drilling geosteering experts, enabled the operator to steer and position the well with greater confidence and maximize exposure of the well to the productive zone. As a result, a series of five production laterals were successfully placed within 20 feet (6 meters) of the top of the reservoir, with a total drilled interval of over 36,000 feet (11,000 meters).

MAXIMIZE ASSET VALUE

By optimizing the placement of the production laterals, the operator was able to access more reserves than wells that had been drilled without the EarthStar service. In addition, the EarthStar service helped the operator to minimize the length of time it typically takes to develop such a complex field, while simultaneously increasing producible reserves and maximizing overall asset value.



Real-time ultra-deep inversion canvas superimposed on geological model

SPE-195538-MS, Ultradeep Resistivity Inversion for Increased Confidence in Areas of Seismic Uncertainty, presented at the 81st EAGE Conference and Exhibition held in London, England, UK, June 3–6, 2019.

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