CASE STUDY

HALLIBURTON

Colorado

CHALLENGES

- Perform openhole re-entry, requiring greater precision than cased hole re-entry
- Maintain precision around previous sidetracks
- Limited magnetic ranging signal attributed to short fish (132 ft)
- Presence of isolation sub in fish
- Nonmagnetic fish with limited passive magnetic ranging signal

SOLUTION

- Established initial detection along the top of the fish before the nonmagnetic section with the Passive Magnetic Ranging system
- Provided re-entry with accuracy for the lower 3/4 of the fish with the WellSpot active magnetic ranging system

RESULTS

- Reduced uncertainty and enabled correct path to interception window
- Accurately aligned trajectory
- Operator re-entered wellbore and regained control
- Maintained 100% success rate to date accessing existing wellbores with the WellSpot active magnetic ranging system
- Oil and gas regulator granted operator permission to drill remainder of well pad

Saving Multi-Well Pad with Magnetic Ranging Systems

Wellspot™ Active Magnetic Ranging System used to bypass fish, precisely align sidetrack, and save pad

Overview

While an operator drilled the first well of a multi-well pad and reached TD at approximately 12,000 ft MD, the BHA assembly became differentially stuck tripping out of the hole (the bottom of the fish was located at 5,055 ft MD). For weeks, the operator attempted various fishing attempts with no success. Upon instruction from a third-party ranging provider, the operator backed off the fish (top of fish at 4,923 ft MD) and cemented back to sidetrack and re-enter the open hole. Two resultant sidetrack attempts to re-enter the original wellbore were unsuccessful.

The oil and gas regulator advised the operator that the original wellbore would need to be re-entered for the remainder of the pad. Based on extensive experience in wellbore re-entry, the operator recruited Halliburton to replace the original directional and ranging provider.

Halliburton deployed the WellSpot™ active magnetic ranging system to successfully detect the fish; however, the surveyed position revealed the target was outside the EOU outlined by the original MWD surveys. After a sidetrack, the WellSpot ranging system was used to improve the target's surveyed position by more than 8 ft, which allowed the operator to regain access to the original wellbore.

Combo solution identified ideal alignment for re-entry

The challenge of openhole re-entry is the limited number of tubulars to generate a magnetic signal to conduct ranging operations. Active magnetic ranging induces a distinct magnetic field, which is then detected by its sensors. By analyzing the magnetic signature of the fish, an optimal trajectory was determined, and the well was re-entered.

CASE STUDY

Challenges with previous Ranging Service

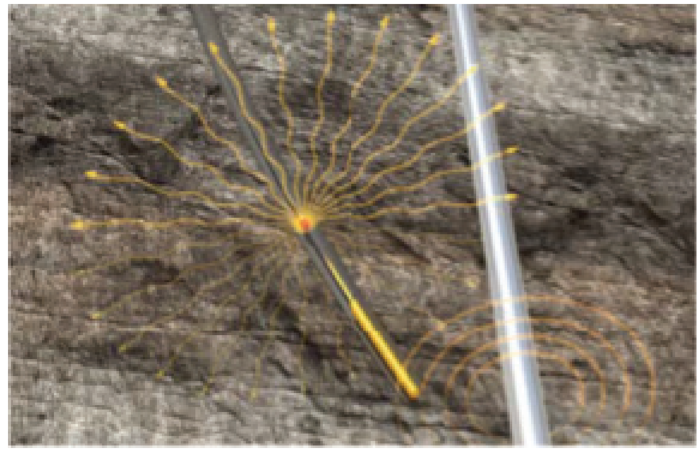
The original surveys, confirmed by an external MWD service, differed from Halliburton's WellSpot™ active magnetic ranging system findings, placing the fish outside the expected operational area (EOU). This discrepancy challenged directional control, yet Halliburton's adjustments to the WellSpot system facilitated a successful trajectory for re-entry into the inactive wellbore.

Entire multi-well pad saved

By re-entering the open hole, the operator salvaged the dormant wellbore and was able to run production equipment to bottom with no issues.

The openhole re-entry appeased the oil and gas regulator and protected the open hole below the fish. The regulator then granted the operator permission to drill the remainder of the multi-well pad.

This marks the third successful use of the WellSpot system for openhole re-entry beyond a fish, maintaining its 100% success record in accessing wellbores.



The WellSpot™ active magnetic ranging system provides a unique service to aid openhole bypass operations.

The WellSpot™ active magnetic ranging system bypassed previous sidetrack attempts to successfully re-enter the open hole.