CASE HISTORY
SAGD PASS-BY WITH Lodestone ACTIVE RANGING SYSTEM

APPLICATION
Collision Avoidance
SAGD Drilling

TECHNOLOGY
Lodestone Active Ranging System,
Keeper Gyro System

LOCATION
Canada Oil Sands,
Alberta, Canada

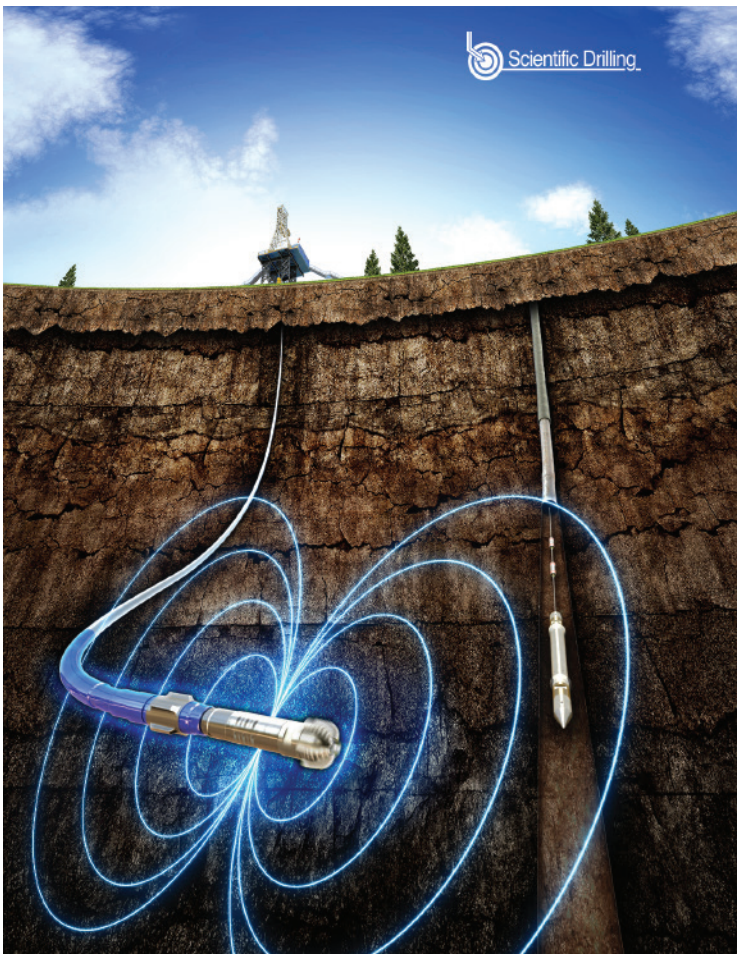
CUSTOMER CHALLENGE
There are several challenges Devon Energy (Canada) was facing when passing by the observations wells on this SAGD project:

1. Pass-bys are time consuming. The customer wanted to spend as little extra time as possible to take ranging shots.
2. The observations wells are typically cased and vertical, which was challenging when utilizing existing technologies known to the customer and used in the past.
3. Some current technologies require wiping in the drilled well, which can compromise well condition in soft formations.
4. Devon Energy wanted to have accurate observation well placement as early as possible to allow the drilling team enough time and space to determine if an adjustment to the well path would be necessary.

SCIENTIFIC SOLUTION
Lodestone was deployed with Keeper Gyro in the cased vertical observation well and magnet Sub behind the drill bit in the drilling assembly. The sub placement makes it an At-Bit ranging solution. The Gyro gave us the ability to know the exact orientation of the Lodestone and its sensor package in the cased well, and in turn gave the ability to measure its relative position to the drilled well with high accuracy and no left/right ambiguities at any point.

The Lodestone technology allows the toolstring with the magnetic source to remain stationary when ranging measurements are performed. This significantly reduces the time needed to acquire ranging data and preserves the integrity of the drilled well. All that was needed to take ranging data was to remain stationary after taking MWD surveys and turning the pumps on for about 1 minute.

We were able to acquire actionable data from as far as 105m to the pass-by point, and that gave the drilling team plenty of time to determine if well path corrections were required.



CUSTOMER VALUE
We were able to pass by the vertical well with a high level of confidence and accuracy while ranging to the bit from a far distance, giving the drilling team ample time to adjust the wellbore position if needed. There was no ambiguity at any point in time to the relative position of the wells. The ranging shots take very little extra time and do not require the toolstring to be moved.

As a result, utilizing the system removed the risk of a well collision and saved 4hrs of rig time on our very first deployment with more savings possible in the future.

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