An offshore operator in China’s Bohai Bay needed to identify the productive gas/oil zones in a new well block. Traditional methods used for gas/oil identification use radioactive or chemical sources to acquire porosity measurements. Because these sources are very restricted in Bohai Bay, the company wanted to find a way to acquire porosity measurements in their 12-¼-in. borehole using another option.

Baker Hughes, a GE company (BHGE), proposed use of its MagTrak™ logging-while-drilling (LWD) magnetic resonance service to gather the measurements and identify the potential gas/oil zones. MagTrak’s real-time nuclear magnetic resonance transversal relaxation (NMR T2) accurately measures formation porosity using no radioactive or chemical materials.

The operator was very interested in testing out this new technology as a potential way to comply with the Bohai Bay restrictions while developing the rest of the block.

The BHGE team finished the porosity measurements in one run and identified the location of gas/oil reservoirs using the following BHGE products:

- MagTrak HD magnetic resonance (MR) service for porosity measurements
- AutoTrak™ rotary steerable drilling system (RSS) with continuous proportional steering
- OnTrak™ integrated measuring-while-drilling and logging-while-drilling service

As a precaution, the operator decided to re-log to confirm the porosity measurements acquired by the drilling group.

- SoundTrak™ acoustic service for large boreholes
- LithoTrak™ acoustic logging-while-drilling service for reservoir navigation

Measurements from MagTrak were confirmed, giving the operator confidence to eliminate the second run for acoustic measurements for additional wells. This saved two days of rig time per well, or approximately $200,000 USD in expenses.

**Challenges**

- Identify productive zones in a new, unknown block
- Obtain porosity measurements in a location with strong source restrictions

**Results**

- Located gas/oil zones with no use of radioactive or chemical sources
- Proved accurate porosity measurements could be obtained with one run
- Saved two days or rig time by eliminating second run

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Real-time gas-oil contact identification due to NMR porosity under-call