

Saka Energi Indonesia Uses MicroScope HD 475 Service to Optimize Completion with HD Images in Carbonate Reservoir, Offshore

High-definition LWD images acquired through highly deviated well in East Java Basin eliminate the need for additional logging run and protect aquifer

CHALLENGE

- Drill high-angle well targeting densely fractured and vuggy carbonate with a risk of mud losses and stick/slip.
- Optimize ICD completion design and its position to protect aquifer near a fracture network.

SOLUTION

Deploy the 475 tool size for the MicroScope HD* resistivity- and high-definition imaging-while-drilling service to obtain high-resolution resistivity-based images for accurate reservoir description and better carbonate evaluation.

RESULTS

- Acquired HD images to identify fractures, enabling optimized ICD and packer positioning.
- Avoided additional LWD run and stick/slip events.
- Prevented risk to nearby aquifer.



Obtain HD images of vuggy, carbonate reservoir with high stick/slip potential

East Java Basin carbonate reservoir is known for being vuggy and having fracture networks with potential connections to an aquifer. Preventing early water breakthrough is crucial and requires HD images to identify potential heavy fracture densities, enabling optimal placement of isolation packers and spacing of ICDs to control reservoir fluid flow and mitigate exposure to the aquifer.

Saka Energi planned a horizontal well to increase penetration length of a productive interval within the reservoir. It would have a high deviation of 80°–90° inclination. Penetrating the vuggy and fractured carbonate reservoir not only presented a hazard for early water breakthrough, but also a strong risk of mud loss, as experienced while drilling nearby offsets. Each offset required an additional, dedicated run with conventional high-angle wireline logging and an added potential for slick/slip.

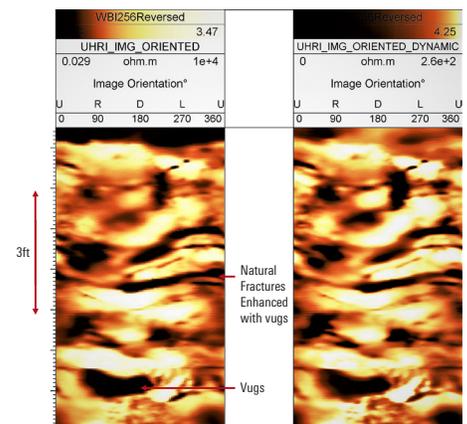
Use MicroScope HD 475 service to acquire formation data while drilling

Schlumberger recommended combining MicroScope HD 475 service with VISION* 475 LWD service and a PowerDrive X6* rotary steerable system. These components would acquire and transmit resistivity-based imaging in real time while drilling for quick fracture and geological feature evaluation. This would enable a quicker design for isolating the target area, using the density caliper from the VISION service and porosity information to design the ICD completion.

Optimized completion design requires accurate formation evaluation because the open fracture presence will boost permeability. Fracture identification and position determine ICD design and positioning. Consequently, higher definition borehole images are required for success.

Captured HD images and averted dedicated run in risky conditions

On reaching TD, the MicroScope HD service identified approximately 1,873 ft of lateral length with conductive fractures and vug fractures, as well as connecting and isolated vugs. Formation evaluation was performed, enabling Saka Energi to optimize the ICD design and packer positions in a timely manner while avoiding an additional, dedicated logging run in high-risk conditions.



High-definition image from MicroScope HD service reveals significant natural conductive fractures and vugs.