

ADMA Uses MicroScope HD 675 Service to Deliver High-Resolution LWD Images in Carbonate Formations

High-definition imaging-while-drilling service gathers high-resolution borehole data from 8½-in section despite high risk of stick/slip

CHALLENGE

Obtain 3,637 ft [1,108.6 m] of high-resolution logging-while-drilling (LWD) resistivity images in a single run through an 8½-in section of a highly deviated well with a high chance of stick/slip.

SOLUTION

Use the MicroScope HD* resistivity and high-definition imaging-while-drilling service in the 675 tool size to provide comprehensive reservoir description—from structural modeling to sedimentology analysis—and to enable detailed fracture characterization.

RESULTS

Obtained high-resolution images of the entire section, despite stick/slip and high deviation.



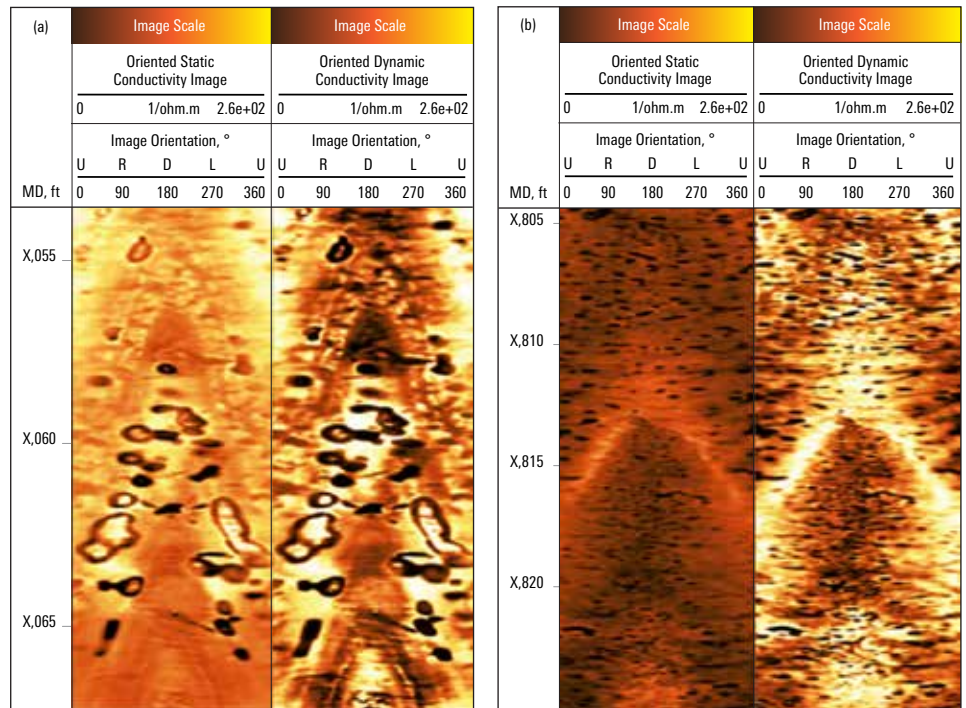
Take high-resolution LWD images of a horizontal section with high stick/slip conditions

Abu Dhabi Marine Operating Company (ADMA) required high-resolution images in a highly deviated well with a high chance of stick/slip. They planned to drill the 8½-in, 3,637-ft [1,108.6-m] section, which began with a 50° deviation that increased to 84° after the first 1,000 ft [304.8 m], through a series of carbonate layers with a conductive water-based mud.

Use the MicroScope HD 675 service to gather data while maintaining ROP

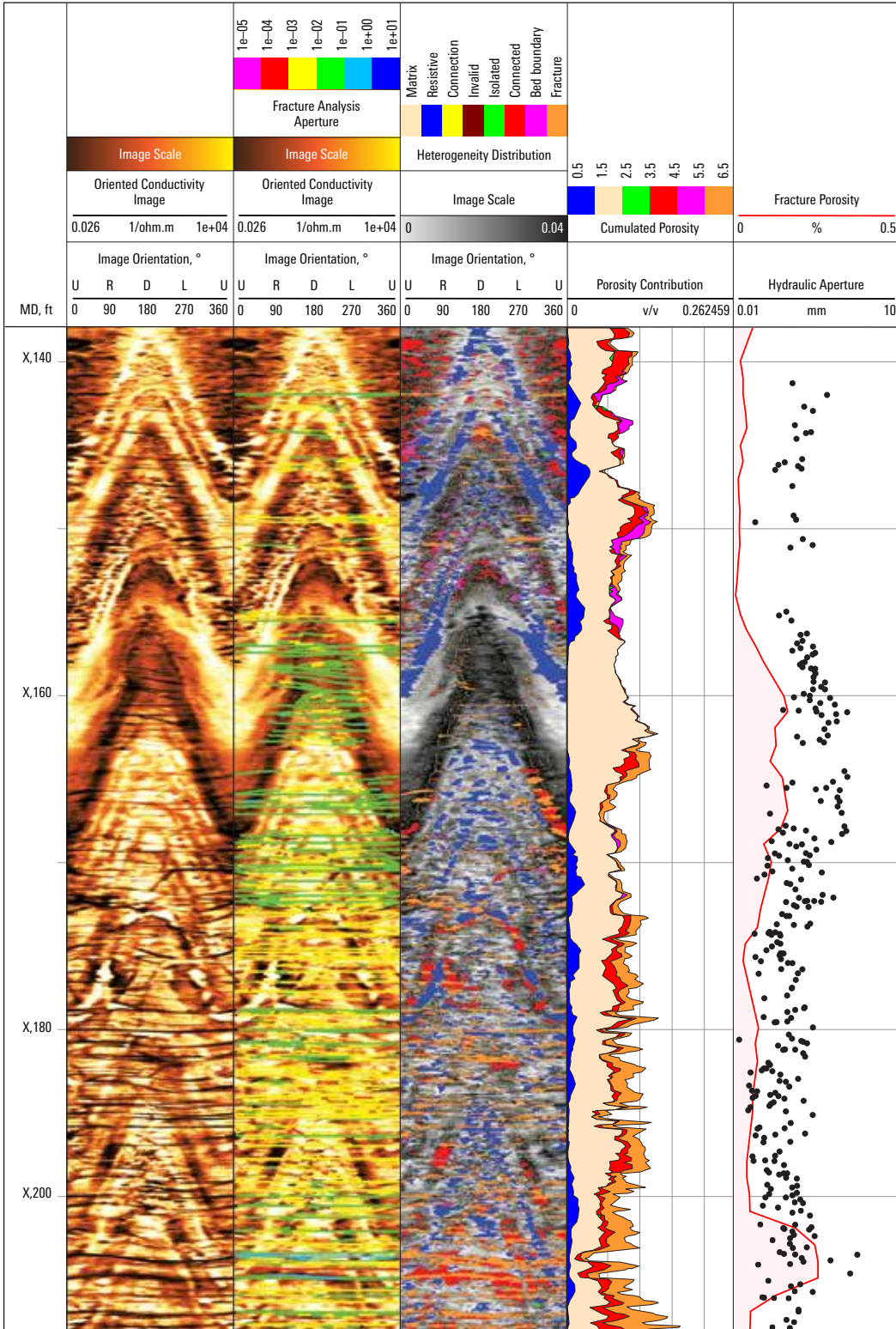
Schlumberger suggested using the MicroScope HD service to fulfill the operator’s high-resolution imaging needs. The MicroScope service measured the resistivity of the highly conductive water-based mud at 0.019 ohm.m through the majority of the section. Throughout drilling, the ROP averaged close to 40 ft/h [12.2 m/h]. The well was drilled with the PowerDrive Archer* high build rate rotary steerable system, and collar rotation was kept high while drilling, averaging around 120 rpm. As predicted, the tools experienced a high amount of stick/slip throughout the section, with rotations varying between 0 and 250 rpm on nearly every acquisition cycle.

Image-based depth corrections were applied at the wellsite, correcting for mismatches in the surface and downhole depths, as is commonly observed when logging while drilling.



The MicroScope HD service provided excellent image resolution. The dataset was rich in microscale features such as conductive patches relating to bioturbation on the boundaries in (a) and in layers on (b).

CASE STUDY: ADMA uses MicroScope HD 675 service to deliver high-resolution LWD images in carbonate formations



Captured high-resolution images of the entire section

Despite severe stick/slip, the rotational-based acquisition of the MicroScope HD service enabled the service to produce high-definition images of the entire section. The LWD images showed a variety of features within this complex carbonate sequence, including layers, crossbeds, bioturbation, diagnosis (solution and cementation), fractures (both conductive and resistive), secondary porosity, cemented patches, and zones with common fractures. The ability to calibrate the image values to a resistivity for the same volume time acquired enabled quantitative analysis using the image values.

Sample interval showcasing secondary porosity and fracture porosity quantification with MicroScope HD service. Fracture traces are shown on Track 2. The heterogeneity classification is shown in Track 3, and the proportions of porosity by classification type is shown in Track 4. The fracture apertures and porosity contribution from the fractures are shown in Track 5.

slb.com/microscopehd



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