**Real-Time, High-Definition LWD Images Guide Placement of 1,279-m Drain Hole in Complex Sand Reservoir for PDO**

MicroScope HD service characterizes complex fault and fracture networks while drilling reservoir affected by challenging fracturation in Oman.

### CHALLENGE

Drill horizontal well through complex siliclastic reservoir with trajectory crossing several faults and dense fracture network.

### SOLUTION

Acquire real-time LWD data using MicroScope HD* high-definition imaging-while-drilling service to guide steering of horizontal section and characterizing of structural dips, faults, and fractures.

### RESULTS

Delivered structural analysis and fractures and faults identification to place 1,279 m of drain within target reservoirs, using images from MicroScope HD service as guide.

Drill along top of formation, crossing multiple faults

Petroleum Development Oman (PDO) tasked its exploration team with drilling several new wells in a field with complex reservoir layers. One well in particular was planned to drill close to the top of the Shuaiba formation and thus expected to cross several faults toward the TD of the well. Anticipated challenges included uncertainties in structure of the formation boundaries, lateral facies changes within the reservoir, multiple fault crossings close to the top of the objective formation, and uncertainties in target depth and thickness.

Porosity distribution in complex reservoir layers using high-resolution images from MicroScope HD.
**CASE STUDY:** High-definition imaging service steers well within target reservoir zone of a complex sand formation

**Use high-definition LWD images to place drain hole within target sand**
Schlumberger recommended acquiring real-time, high-definition images with MicroScope HD service to identify the fracture and fault zones and compute structural dips required to place the drain hole in the target sand reservoir and close to top of the Shuaiba formation. The faults caused the well trajectory to exit the reservoir at one point in the horizontal section, entering a shale layer. But using real-time imaging from MicroScope HD service, the drilling team was able to adjust trajectory and get the well back on track within the objective sand layer.

**Steer drain hole through reservoir for total of 1,279 m**
The resistivity images enabled successful steering of the drain hole for 515-m MD within the first reservoir lobe and 764-m MD within the second reservoir lobe—a total of 1,279 m in zone. Using high-definition imaging from MicroScope HD service, the team kept the drain trajectory within 1 m of the top of the target Shuaiba formation. This LWD service was of great value in interpreting dips and better defining the reservoir boundaries structural behaviour.

The well encountered five minor faults, as expected, with throws varying between 0.3–1.4 m, and the images from MicroScope HD service were used to successfully steer the well within the target reservoir zone.

PDO has since deployed the MicroScope HD service on several wells in the field.

Curtain section using MicroScope HD images and other LWD data to successfully geosteer the drainhole through multiple faults.