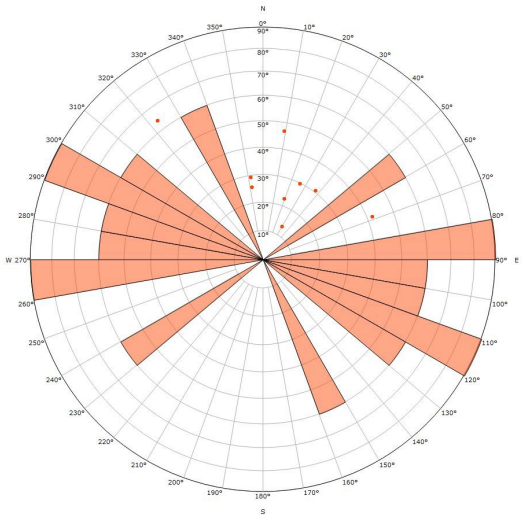
Resistivity Image Interpretation Recognized Unexpected Fault, Sand-to-Shale Fracture Breakout Directions, Enabled Additional 3D Reservoir Modelling



The Schmid Net Stereonet plot for fault direction and fractures.

Objectives

- Detect faults and fractures in a reservoir with a higher sand ratio to characterize the geologic structure and stratigraphy of the field.
- Evaluate the in-situ stress interpretation, bedding dip determination, and any indication of a potential fault presence not visible in the seismic images to be used in 3D reservoir modeling. The sand-to-shale fracture breakout directions is critical and will need to be used in the 3D reservoir modelling as the customer prepares to expand the production plan.

Our Approach

- Weatherford experts recommended deploying the cross-dipole sonic (CXD) tool and a Compact™ microimager (CMI) on a bottomhole string along with the following components: mono-cable head, Compact tool adapter, Compact swivel head adaptor, Compact comms gamma, Compact memory section, and a Compact electrode section.
- After the speed correction, the high data quality was confirmed to be fit for the interpretation.
- About 1,100 of the total bedding features were picked with variable directions. Approximately 60 conductive continuous and discontinuous features with scattered strike directions with no real dominant cluster, and about 30 resistive fractures features were picked.

LOCATION
Indonesia

WELL TYPE
Onshore, directional, J-type

HOLE SIZE
8-1/2 in.

TEMPERATURE
277°F (277°C)

PRODUCTS/SERVICES
- Cross-dipole sonic (CXD) tool
- Compact microimager (CMI)
- Gamma ray (MCG) tool
- Multi-thickness detector (MTD)
- Compact imager electrode (MIE)

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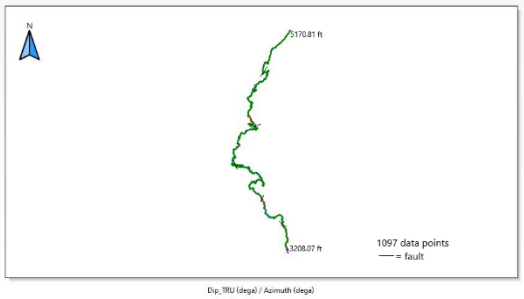
Our Approach (continued)

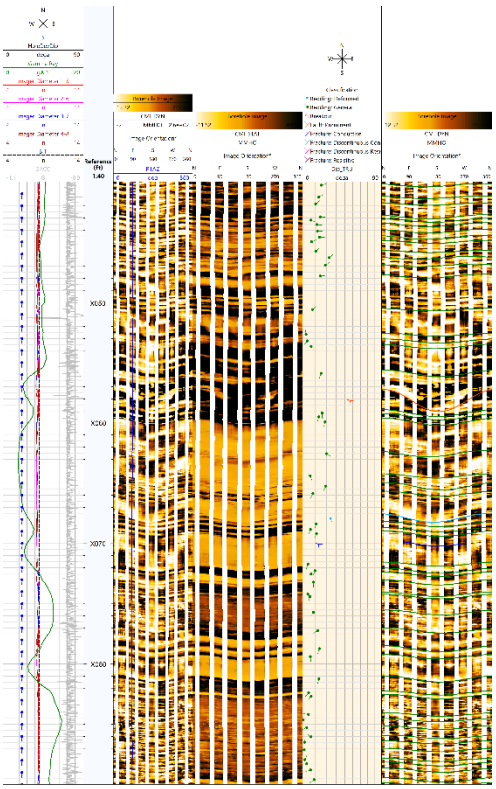
- Three unexpected faults were found with 045° to 225° (NE to SW) and 115° to 295° (ESE to WNW) directions.
- Around 24 of the total breakouts were picked with the concentration direction being 145° to 325° (SE to NW).

Value to Customer

- The high-quality CMI processing results showed the significant change at certain depths which corresponded to the fault appearance and seen in a walkout plot.
- These faults were not visible in the seismic profile previously recorded.
- The Weatherford result provided a significant contribution to the geomechanics and stratigraphic modelling input of the static 3D model and enabled the customer to optimally plan further reservoir management.



This picture shows the azimuth walk-out plot with dip picking in the SSW direction centered at 200° and the potential fault presence (black strike).



The left-side plot shows the CMI Image processing results with the static and dynamic results, the bedding, breakouts, and fault across x001 to x083 m.

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