

Compact™ Oil-Base Mud Microimager

Identifies Fractures in Thin-Layered Tight-Oil Reservoir

Objectives

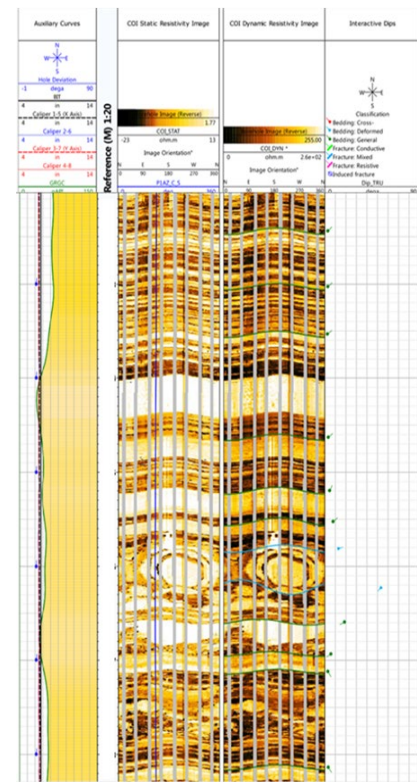
- Obtain high-quality image data in a turbidite deposit drilled with oil-based mud (OBM).
- Identify natural and induced fractures, and determine their strike direction to ascertain orientation of primary and secondary stress fields.
- Characterize thin-layered tight sands and shale intercalations.
- Determine strike, dip, and lateral continuity of sand bodies.
- Provide a comprehensive petrophysical evaluation of the well.

Our Approach

- Weatherford Wireline Services specialists met with the operator to outline a logging program to deliver the data needed for achieving its exploration and production goals in this relatively undeveloped area. The operator would need additional downhole data to determine the extent of hydrocarbon reserves and to guide completion program and field-development plans.
- The Weatherford team proposed running a Compact quad-combo logging suite to obtain a comprehensive petrophysical evaluation of the well. They also suggested a microimaging log to highlight fine layers and geological features as well as to obtain formation dip. Because wellbore stability issues required the operator to drill with oil-based mud, the Compact oil-base mud microimager (COI) was recommended.
- The wireline crew ran the Compact quad combo, together with the COI, to total depth and logged up to the casing shoe. This operation marked the first time that Weatherford had run the COI microimager in Mexico.
- Weatherford Reservoir Intelligence Network petrophysicists worked closely with the customer to analyze the logging data, identify pay zones, and make correlations with other wells in the area.

Value to Customer

- The COI tool obtains high-resolution data from eight sensor pads, which cover 30% more area than other imaging tools. The logs helped to define bed boundaries, highlight cross-bedding within sand bodies, and identify natural and induced fractures as well as their orientations.
- The Compact quad-combo suite provided data for a thorough petrophysical evaluation. Using this data, Reservoir Intelligence Network log analysts helped the operator to determine porosity, saturations, and sand counts, and it presented the results to the operator in a composite log.
- Reservoir experts used sonic data and COI data to complement a rock mechanical properties analysis they had previously performed for the operator, which provided ample information for advancing a thorough geomechanics evaluation of the field.
- By running the COI tool in combination with Compact quad-combo tools, the wireline crew avoided an extra log run, to save roughly US \$25,000 in rig time.



High-resolution COI imaging log shows layers of tight sand intercalated with the shales of a deepwater turbidite formation. Formation dip is also presented.

LOCATION

Veracruz, Mexico

FORMATION

Chicontepec—tight oil sands and shales

WELL TYPE

Onshore, exploration

MAXIMUM HOLE ANGLE

21°

HOLE SIZE

6-3/4 in.

MAXIMUM TEMPERATURE

176°F (80°C)

TOTAL DEPTH

6,030 ft (1,838 m)

PRODUCTS/SERVICES

- Reservoir Intelligence Network
- Wireline openhole services
- Compact oil-base mud microimager (COI)
- Compact quad-combo logging suite:
 - Compact gamma sonde (MGS) tool
 - Compact dual neutron (MDN) tool
 - Compact photodensity (MPD) tool
 - Compact sonic sonde (MSS) tool
 - Compact array induction (MAI) tool

