Talos Energy Proves Zama Field Connectivity with Fluid Samples Obtained via Controlled Low-Pressure Drawdown

Ora wireline formation testing platform used intelligent planning to guide focused sampling for thorough assessment of stacked sands in two appraisal wells.

Talos Energy Inc. employed the Ora* intelligent wireline formation testing platform for downhole fluid analysis (DFA) and sampling in two complex wells, enabling conducting reservoir fluid geodynamics to confirm connectivity in unconsolidated sands that could not be sampled with conventional technology.

What Schlumberger recommended

Located approximately 60 km off the coast of Mexico in the Sureste Basin, the Zama Field is thought to be one of the world’s largest shallow-water oil discoveries. Initially identified as a three-way dip structure sealed against salt, the field’s massive stacked turbiditic sands are overlain by a thick hemipelagic shale. In the first exploration well, sampling was limited because of well complexities and the loosely consolidated reservoirs. Without multiple representative fluid analysis and samples, reservoir connectivity could not be assessed. This had to be addressed during appraisal.

What Schlumberger recommended

The Ora intelligent wireline formation testing platform leverages new architecture and metrology to apply focused sampling with a 3D radial probe for acquiring pure fluid samples and conducting DFA. The wideband downhole pumps precisely govern their broad dynamic range with automated flow management, which enables the controlled low-pressure drawdown necessary to prevent sanding in unconsolidated reservoir intervals. The real-time DFA guides the sampling process, identifying additional depth intervals that require characterization for assessing reservoir continuity through application of the new discipline of reservoir fluid geodynamics (RFG).

What Talos Energy achieved

More than 30 pressure-compensated high-purity fluid samples were efficiently collected with the Ora platform at multiple depths in station times of only 1 to 2 hours. The real-time optical density measurements of different zones in the two wells confirmed reservoir continuity. The RFG analysis also indicated that the multiple stacked sands were laterally connected.

Subsequent laboratory analysis of the samples confirmed the determination of lateral connectivity. Petroleum geochemistry analysis also corroborated the DFA fluid gradient and RFG asphaltene concentration gradient models to provide further insight on the timing of migration and reservoir charging. Interpretation of geological image logs and subsequent full-core analysis were consistent with gradient analysis, with further confirmation of the predicted lateral connectivity provided by a multizone well test.

Talos was very interested in bringing the latest technology to our appraisal program at Zama. The new Ora platform allowed us to achieve our objectives of collecting very clean samples throughout the reservoir to enable highly reliable advanced fluid studies.

Loren Long
Vice President–Mexico
Talos Energy

Unlike conventional wireline formation testing in Well 1, which retrieved only a single optical density measurement in the challenging conditions, the Ora platform’s real-time operations included performing excess pressure and asphaltene gradient analysis to support understanding of vertical and lateral reservoir connectivity. For example, Well 3 reflects vertical connectivity across lengthy zone (labeled Z-) 3, and lateral connectivity in zone 3 between wells 2 and 2ST is inferred by the alignment of their optical density stations with a single asphaltene gradient. Similar analysis was elaborated for zones 4 through 7 to improve reservoir modeling.
Case study: Ora platform proves Zama Field connectivity for Talos Energy, Gulf of Mexico

From this preliminary 3D analysis of the real-time optical density measurements, further DFA data, laboratory PVT data, and geochemical analyses are being conducted within the RFG workflow for the field.

Focused sampling with the Ora platform’s 3D radial probe achieved fluid cleanup close to zero contamination in less than an hour.