Seismic-While-Drilling Service Resolves Depth Uncertainty Offshore Southeast Asia

Real-time checkshots and images help geostop hole section and select casing point above carbonate reservoir

**CHALLENGE**
Resolve uncertainty about depth of carbonate reservoir to set casing within 20 m of the formation top for successful well construction.

**SOLUTION**
Use seismicVISION* seismic-while-drilling service to update depth prediction at every connection.

**RESULTS**
- Accurately geostopped 12\(\frac{1}{4}\)-in hole section.
- Set 9\(\frac{5}{8}\)-in casing as planned.

The seismicVISION service enabled the drilling team to resolve the ±50-m uncertainty about the depth of the carbonate reservoir and geostop the 12\(\frac{1}{4}\)-in hole section before penetrating the formation top.

**Set casing on top of offshore carbonate formation**
An operator in Southeast Asia drilling an offshore vertical exploration well wanted to avoid accidental penetration of the carbonate reservoir near the 12\(\frac{1}{4}\)-in hole section because it could lead to a kick and possible loss of the well. Successful completion of the well required setting the 9\(\frac{5}{8}\)-in casing within 20 m of the top of the carbonate formation—and there was a ±50-m uncertainty about its depth, despite the availability of a 3D prestack depth migration and offset well data.

**Update depth prediction of formation top**
The seismicVISION service was selected to acquire real-time checkshots and images for updating the predicted depth of the formation top. Because the checkshots were acquired during connections for best acoustics, a minimal amount of rig time was required.

After the seismic level had been acquired at a connection, windowed real-time waveforms were transmitted uphole using mud pulse telemetry. The checkshots were then processed from the waveforms at the wellsite, and real-time depth updates were calculated while drilling continued. A real-time corridor stack processed from the real-time waveforms showed the seismic position. Extrapolating a depth projection to the formation top from the look-ahead (reflectivity) information enabled the drilling team to geostop the 12\(\frac{1}{4}\)-in section before it penetrated the carbonate formation.

A real-time corridor stack processed from seismicVISION waveforms while downhole uses a dashed line (above the two-way time of 1.2 s) to indicate the interpreted top of the carbonate formation.
CASE STUDY: Real-time checkshots and images help geostop hole section and select casing point

These real-time seismic waveforms were transmitted uphole using mud pulse telemetry.

**Set casing without penetrating formation top**

Using seismicVISION service to revise the depth prediction in real time at every connection, the drilling team resolved the ±50-m uncertainty about the depth of the carbonate reservoir and geostopped the 12 1/4-in section before it penetrated the formation top. The 9 5/8-in casing was set within 20 m of the formation top, as was required for successful completion of the well.

Contact your local Schlumberger representative to learn more.