

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 12¼-in hole section.
- Set 9⅝-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 12¼-in hole section before penetrating the formation top.



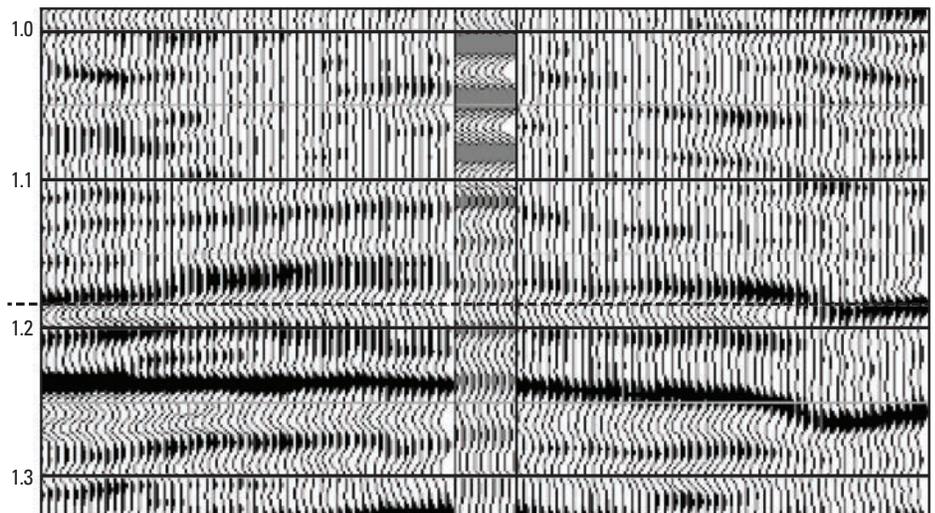
Set casing on top of offshore carbonate formation

An operator in Southeast Asia drilling an offshore vertical exploration well wanted to avoid accidental penetration of the carbonate reservoir near the 12¼-in hole section because it could lead to a kick and possible loss of the well. Successful completion of the well required setting the 9⅝-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

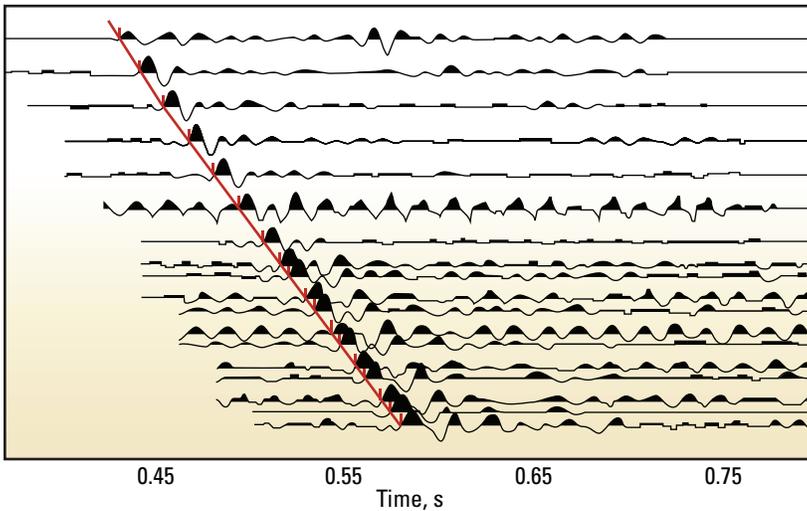
The seismicVISION service was selected to acquire real-time checkshots and images for updating the predicted depth of the formation top. Because the checkshots were acquired during connections for best acoustics, a minimal amount of rig time was required.

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 12¼-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

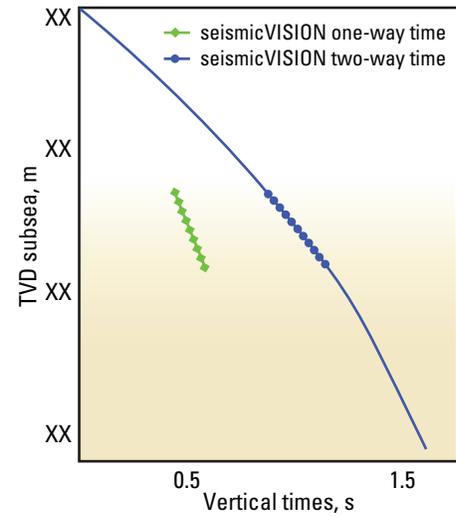


These real-time seismic waveforms were transmitted uphole using mud pulse telemetry.

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 $\frac{1}{4}$ -in section before it penetrated the formation top. The 9 $\frac{3}{8}$ -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.



Checkshot updates from processing the seismic waveforms showed that the actual velocity trend in the wellbore was slower than the predrill model, implying that the actual target depth was shallower than the predrill prognosis.

www.slb.com/seismicVISION