Case study: Asia

INTeX detected cement bond and avoided well remediation costs

A major operator in Asia was working to abandon a land well and needed to ensure zonal isolation in critical areas. A known challenge would be detecting the existing light-weight cement bonding behind the pipe.

A light-weight cement slurry with glass beads had been used in the well. Cement behind the pipe had approximately 6 months of curing time in a conventional casing. Expected cement strength modeled in the laboratory was 700 psi, but a lower figure was anticipated due to possible contamination. The wellbore was filled with water-based mud (WBM) of 10.2 ppg. It would be important to confirm the presence and assess the quality of the cement over two key zones located behind a large 13⅝-in. 88.2# casing.

Baker Hughes proposed using its **Integrity eXplorer™ (INTeX™) cement evaluation service** in combination with Baker Hughes **Segmented Bond Tool™ (SBT™) well integrity evaluation service** for this operation.

INTeX was the optimal choice because it uses shear waves that respond only to solids and can accurately detect cement slurry densities. Its patented electromagnetic-acoustic transducer (EMAT) sensor technology obtains measurements across the widest range of cement weights in the industry—including weights as low as 7 ppg. INTeX provides shear, Lamb, and variable density log (VDL) measurements to determine cement bond and microannulus, without requiring a pressure pass. INTeX provided a shear measurement in a pad tool configuration using EMAT to clearly detect the cement bond behind the casing.

The SBT has fully collapsible, motorized arms that can be run through varying sizes of tubing, opened to log the exposed casing section, and closed to safely extract the tool out of the borehole. The SBT quantitatively measured the cement bond integrity in six angular segments around the casing to deliver information needed to confirm hydraulic isolation. This data was used to accurately assess whether remedial work would be required prior to executing completion.

The combination of Baker Hughes services successfully detected the light-weight cement behind the pipe. The shear and lamb wave attenuation measurements showed cement bond in tandem with the variable density log (VDL) and SBT across the key zones. Attenuations as high as 15 dB/ft were observed, providing confidence in the cement bond detection.

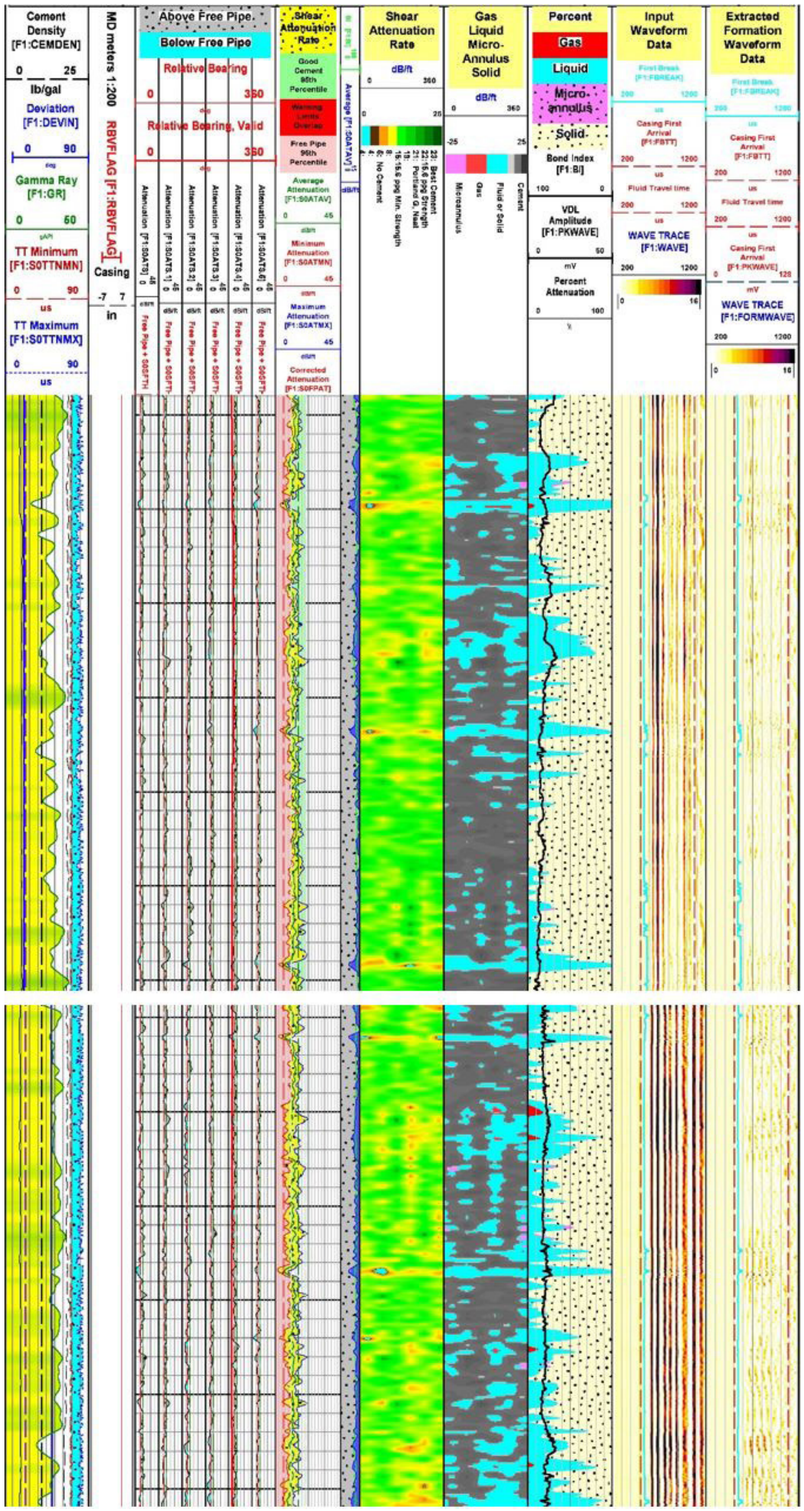
The results indicated that there was no need for remedial work to improve zonal isolation. The operator was able to proceed with abandonment of the well and avoid expensive grouting procedures.

Challenges

- Existing light-weight cement slurry with glass beads
- Large 13⅝-in. casing

Results

- Accurately identified light-weight cement
- Evaluated reservoir zonal isolation
- Reliable log results helped avoid expensive remedial grouting procedures



INTeX log showing a good cement bond over the pertinent reservoirs

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