

Case study: Northeastern, United States

INTeX service performed industry's first wireline cement evaluation logging in air-filled borehole

Operators in the Northern U.S. store natural gas for future use in underground gas storage (UGS) wells. Evaluating the casing cement for zonal isolation in these wells has proved to be costly because of the time and resource-intensive nature of the operation.

Conventional cement evaluation services require operators to relieve stored gas pressure, kill the well, and fill the wellbore with liquid to get effective cement evaluation data. In order to minimize losses, operators wait until the well pressure is lower than the well discovery pressure, but this condition typically occurs only once a year, significantly limiting the time when cement evaluation in these wells is possible. To reduce operational cost, safety, and environmental implications, operators need the ability to log these UGS wells at any time.

To address this issue, Baker Hughes deployed the **Integrity eXplorer™**

cement evaluation service in two of the gas-filled wells. The wireline logging service was run under pressure of the wellhead.

Using electromagnetic-acoustic transducer (EMAT) sensor technology, the Integrity eXplorer service successfully provided cement evaluation data without fluids in the borehole. The data acquired matched previous data provided by the Baker Hughes **Segmented Bond Tool™ (SBT™) service** obtained several years prior, when in the presence of borehole fluids. This comparison gave the operators the reassurance they needed to determine long-term zonal isolation.

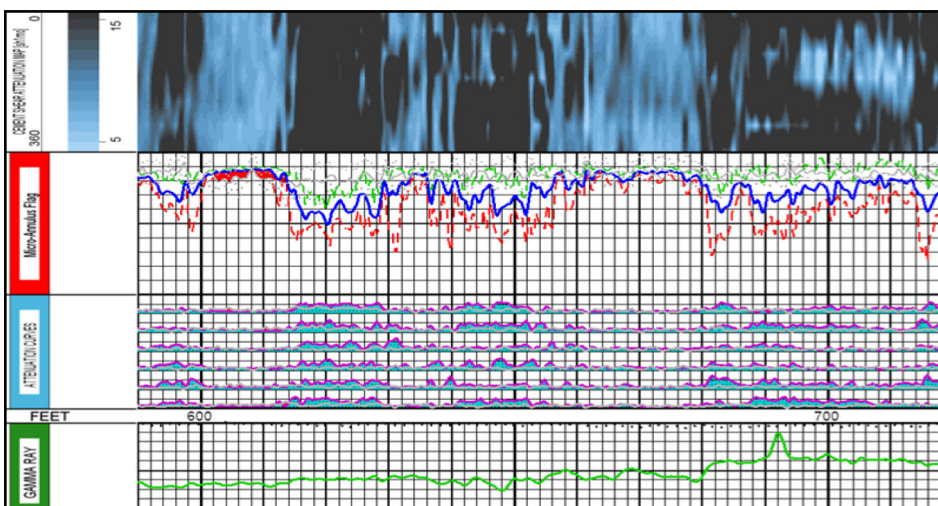
Operational and remedial expenses were significantly reduced by deploying the Integrity eXplorer service, which eliminated the need to set a plug, fill up the well with fluid for cement evaluation, and then empty the well once again to restore the storage functionality.

Challenges

- Evaluate cement in the absence of borehole fluids to determine zonal isolation

Results

- Evaluated cement in gas-filled wellbore
- Eliminated the need for additional operational and remedial services related to cement evaluation
- Helped operator determine long-term zonal isolation
- Saved rig time



A microannulus flag and a cement shear attenuation map, shown in the cement evaluation log by the INTeX service, indicate that measurements can be obtained without borehole fluids.