Overcoming Lost Circulation across Dolomite
Location: North America

CHALLENGE – For sustainability and environmental concerns, well-integrity standards are regulated and monitored for compliance by governmental bodies. Loss of circulation during drilling and primary cementing operations is a serious concern because it can jeopardize well integrity. Fluid loss to the formation can range from seepage to complete losses and can be caused by a number of different factors including highly permeable formations, naturally fractured formations, cavernous formations and/or induced fractures.

An operator was incurring costs associated with loss of circulation events across the brown dolomite section of the Anadarko basin. These costs resulted from non-productive time, remedial operations expenses and fluid-replacement costs and ranged from $120,000-$170,000 (USD) on individual wells. To address the lost-circulation issues in the Anadarko basin, this operator had been relying on multi-stage cementing of the intermediate casing across the dolomite.

Although expensive, this operation facilitated complete coverage of the dolomite for regulatory-compliant zonal isolation and well integrity. However, to manage costs and gain rig-time efficiencies, the operator wanted to eliminate the multi-stage cementing operation.

SOLUTION – Halliburton proposed the Arx™ LCM Package, a solution that was proven to mitigate loss of circulation across the dolomite section in the Granite Wash. The Granite Wash wells successfully cemented using the Arx LCM package were horizontal wells with TMD (total measured depth) often between 10,000 ft and 12,000 ft. The kick-off point to build the curve was at around 7,000 ft and 8,000 ft total vertical depth, several thousand feet below the brown dolomite normally encountered in the Granite Wash. An otherwise significant challenge, the Arx LCM package made it possible to maintain returns to surface during cementing operations.

In order to apply this advanced loss-circulation solution to the Anadarko basin, the operator and Halliburton worked together, evaluating previous field applications of the Arx LCM Package and conducting rigorous laboratory tests of the Arx LCM package in cement slurries.

A single slurry was designed to cover the entire annular span of the intermediate casing. The cementing operation involved adding the Arx LCM package materials on-the-fly while monitoring downhole equivalent circulating density (ECD) to determine the proper concentration of materials needed to maintain circulation.

RESULT – Cement was successfully placed across the brown dolomite in a single cementing stage and circulation at surface was maintained, meeting regulatory requirements for zonal isolation throughout the entire subsurface. Use of the Arx LCM package not only eliminated multi-stage cementing costs, but helped the operator avoid costs previously experienced due to loss of circulation events across the brown dolomite.

To date there have been 132 field applications involving the Arx LCM package throughout North America, contributing to more than $15 million (USD) savings for costs associated with issues resulting from brown dolomite.

For more information on the Arx™ LCM package, please call your local Halliburton representative or email us at cementing@halliburton.com.