CASE STUDY

HALLIBURTON

Permian Basin

Resin and thixotropic cement restore zonal isolation in Midland Basin

Two-stage solution with WellLock® resin system seals narrow annulus and eliminates water flow

CHALLENGE

- Water flow resulted in casing corrosion
- Sustained casing pressure
- Conventional remedial solutions proved ineffective
- Required narrow annulus tieback remedial operation
- Lost production

SOLUTION

- Placed WellLock® resin system
- Conducted two-stage remedial operation

RESULT

- Sealed fracture zone and achieved competent barrier
- Returned well to production

Overview

Operators in the Midland Basin face a common challenge during cement operations in the over-pressured water injection San Andres formation. A deeper low-pressure zone causes cross flow, which allows injected water from the San Andres to migrate downward into the lower-pressure zone. This can lead to poor cement coverage behind intermediate and production casing and can result in sustained casing pressure (SCP) and casing corrosion. As a result, operators often face production delays during remediation attempts.

Challenge

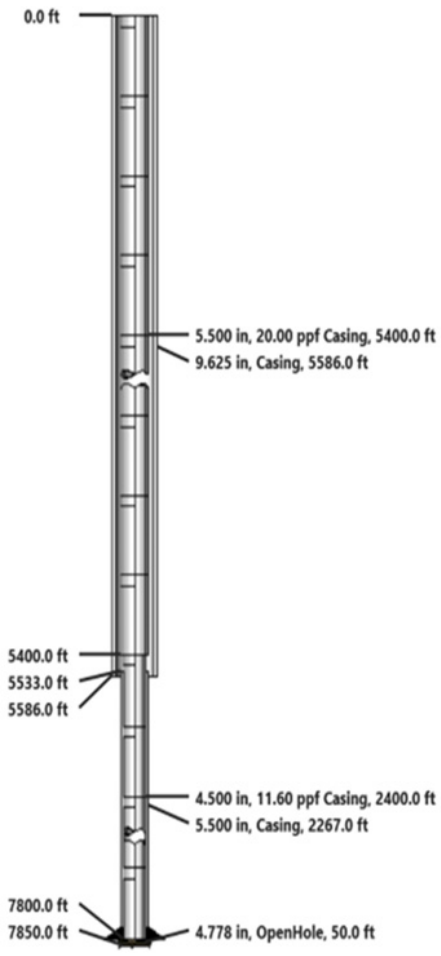
An operator's conventional cement squeeze attempts failed to remediate the corroded casing because of heavy density cement losses into the formation behind the corroded casing. After multiple failed remedial attempts, the operator pulled the corroded portion of the casing out of the well and ran a 4 1/2-in. tapered tieback string into the open hole and inside the uncorroded 5 1/2-in. casing that remained. This created a narrow 0.278-in. annulus between the 4 1/2-in. tapered string and 5 1/2-in. casing, which made particle-laden conventional cement solutions unsuitable due to anticipated high friction pressures and potential particle bridging.

Solution

To establish zonal isolation and prevent future corrosion, Halliburton proposed a two-stage remedial plan with a DV tool placed in the tieback casing above the fracture zone. The first stage involved the WellLock® resin system. Halliburton chose this solids-free epoxy resin solution to mitigate the anticipated high placement pressures and avoid bridging in the narrow annulus. In the second stage, the crew placed thixotropic lead and tail cement designs through the DV tool and into the San Andres formation. After the crew closed the tool, they squeezed cement down the annulus into the loss zone to seal the zone and stop water flow.

Result

After Halliburton completed both stages, the WellLock® resin system and the thixotropic cement sealed the fracture zone and provided a competent barrier throughout the formation and production interval. This tailored solution addressed common Midland Basin challenges, which allowed the operator to reduce nonproductive time (NPT) associated with remedial operations and accelerate well reactivation.



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