

ECONOMICALLY RESTORE ANNULAR CEMENT INTEGRITY

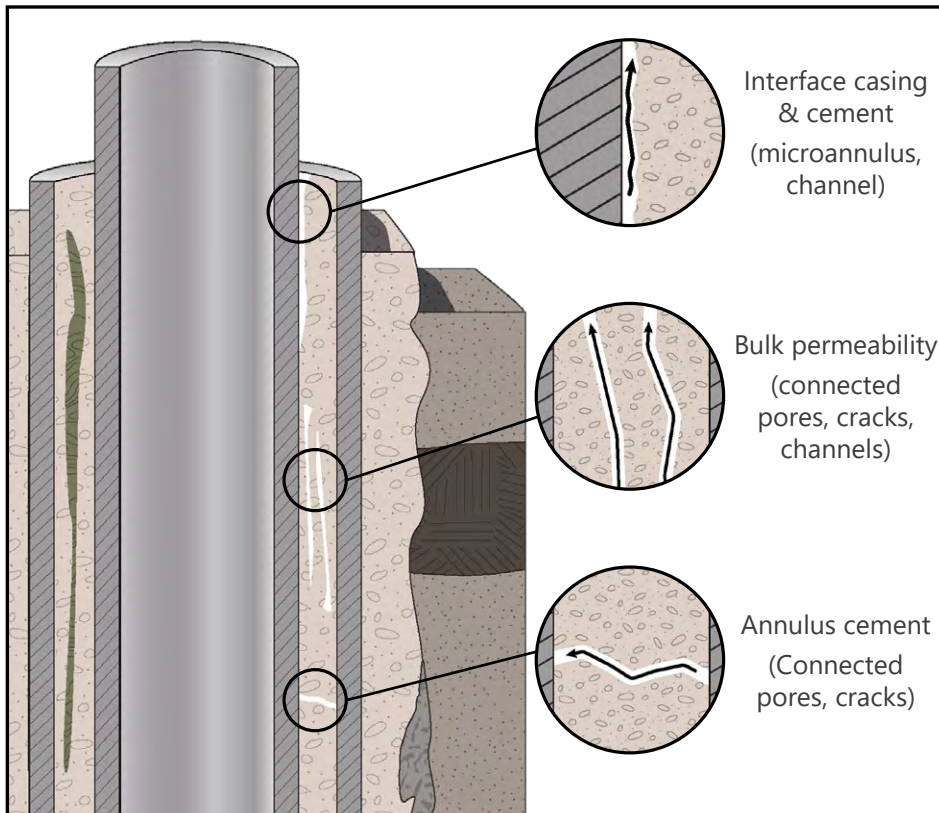
The Annular Cement Restoration Tool (CRT)



THE PROBLEM

Annular cement leakage behind the casing causing **SACP** (Sustained Annulus Casing Pressure) or an inability to place a Well Barrier plug inside the casing for temporary or permanent abandonment.

Typical annular leakage causing SACP



THE CHALLENGE

Restore the Cement Integrity and Bond strength with the minimum of intervention cost whilst keeping the casing pressure envelope intact.

How can;

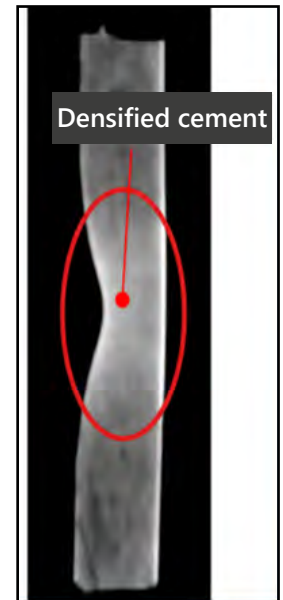
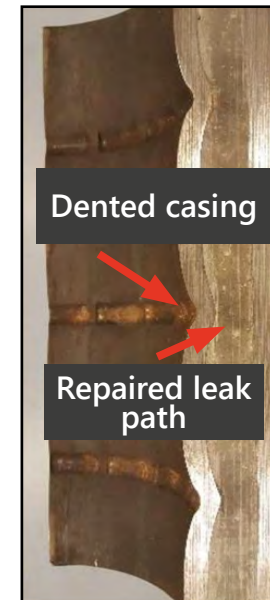
- we find a low-cost reliable method of **RESTORING** the annular cement in the well?
- this be done either riglessly or else from a low-cost surface package?
- we improve over Perf & Squeeze techniques? 30% Success rate (SPE-106765)
- this be done without explosives?
- this be done covering either casing inside casing or else casing inside open hole?

[Click to view Cement Rehydration overview](#)

THE PROCESS

Controlled plastic expansion of the casing I/D:

- Closes gaps (micro annuli, channels, cracks, fissures)
- Increases local CBL bond index
- Reduces porosity (increasing density) through the compression process
- Allows unreacted cement particles to be exposed to free pore water which rehydrates and resets the cement structure (regains hardness and stiffness)



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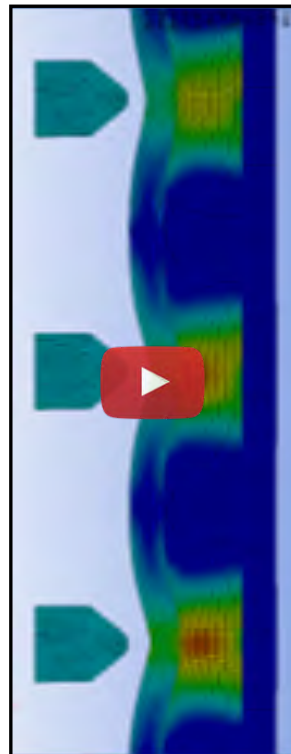


THE SOLUTION

- The **ANNULAR CEMENT RESTORATION TOOL** uses a simple Mechanical Expansion Cone and Expansion Head driven by the Ardyne DHPT with application of string pressure from surface.
- Controlled linear thrust from the DHPT drives the expander head up the cone and applies high radial contact pressure to the I/D of the casing.

[Click to view Ardyne Cement Restoration Tool BHA details](#)

[Click to watch expander analysis](#)



EXPANSION TECHNOLOGY TRACK RECORD

- 11 vertical gas wells covering 4-1/2", 5-1/2" and 7" surface casing
- Expansions set between 250m to 1500m
- Work covering Nov-2018 till Feb-2020
- All 11 wells confirmed dead by Regulator

— Flow Rate — Vent Pressure

