

# ECONOMICALLY RESTORE ANNULAR CEMENT INTEGRITY

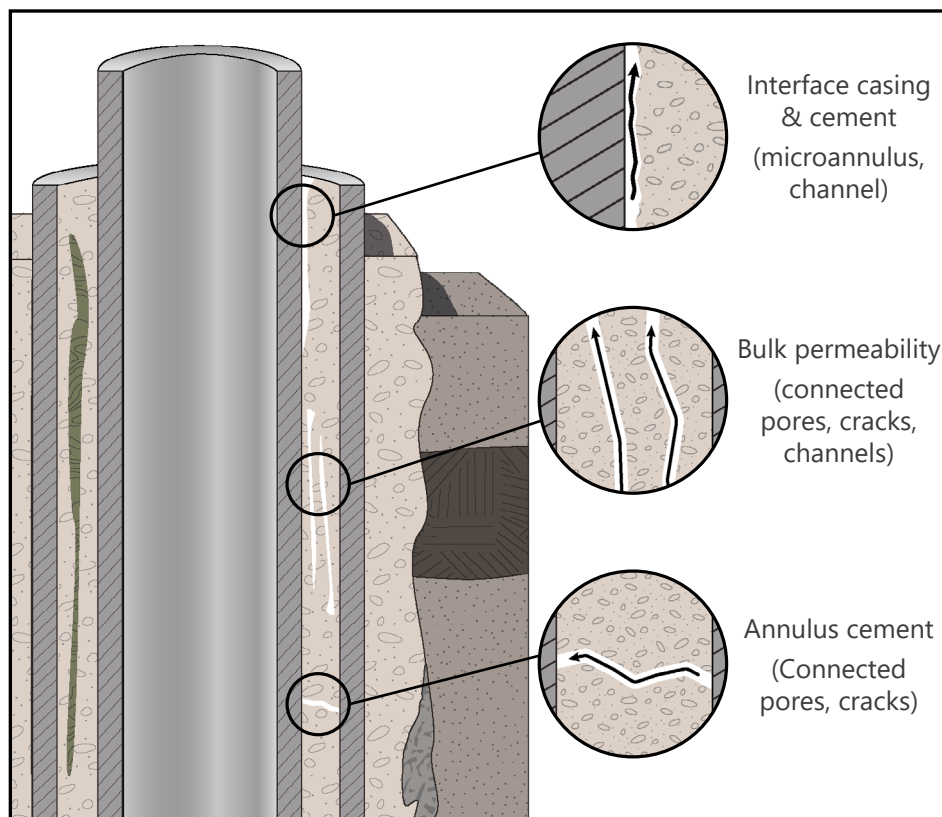
The **ACE** Tool (Ardyne Casing Expander)



## 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;

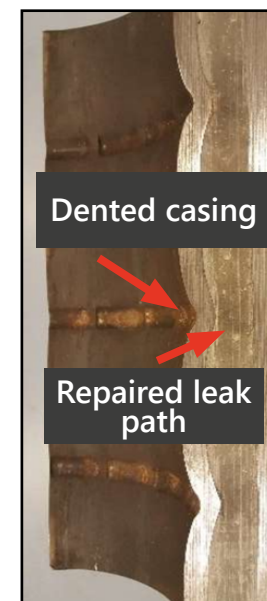
- we find a low-cost reliable method of **RESTORING** the annular cement in the well?
- this be done either riglessly or else from a low-cost surface package?
- we improve over Perf & Squeeze techniques? 30% Success rate (SPE-106765)
- this be done without explosives?
- this be done covering either casing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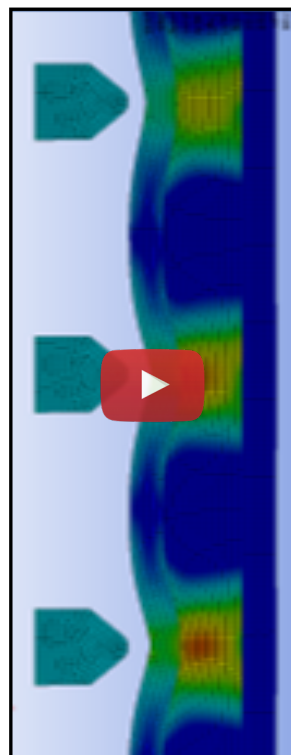
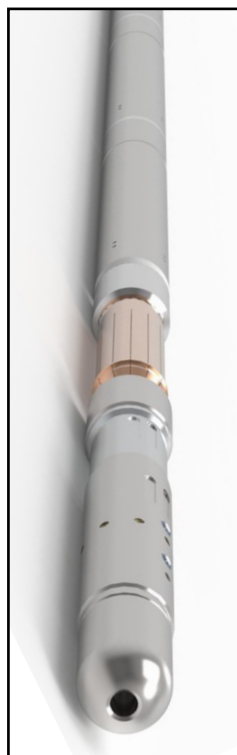


## THE SOLUTION

- The **Ardyne Casing Expander 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 Casing Expander 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

