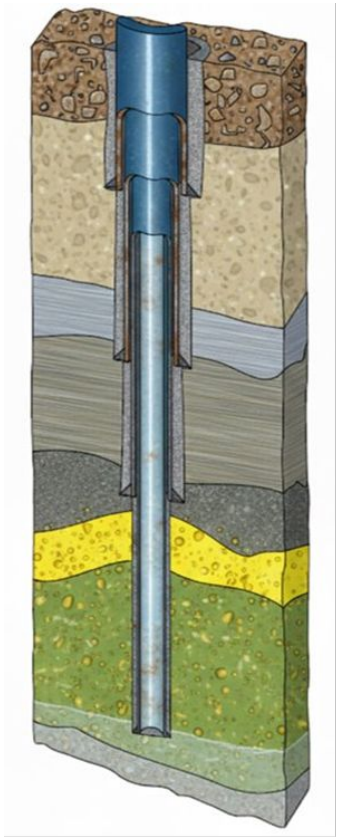
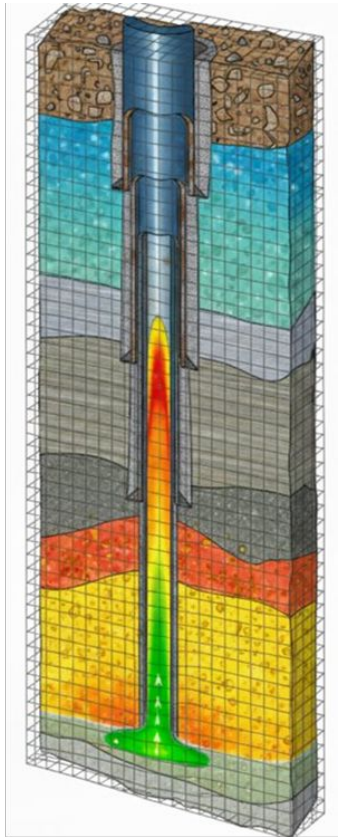
Well Digital Twin for Maintaining Long-Term Integrity for New and Repurposed Geothermal Wells



Real well



Digital Twin

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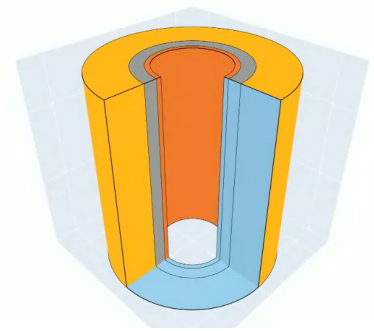
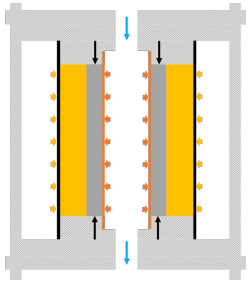
DRISCO Simulator and Validation

Risk-oriented well integrity simulator



Casing Cement Formation

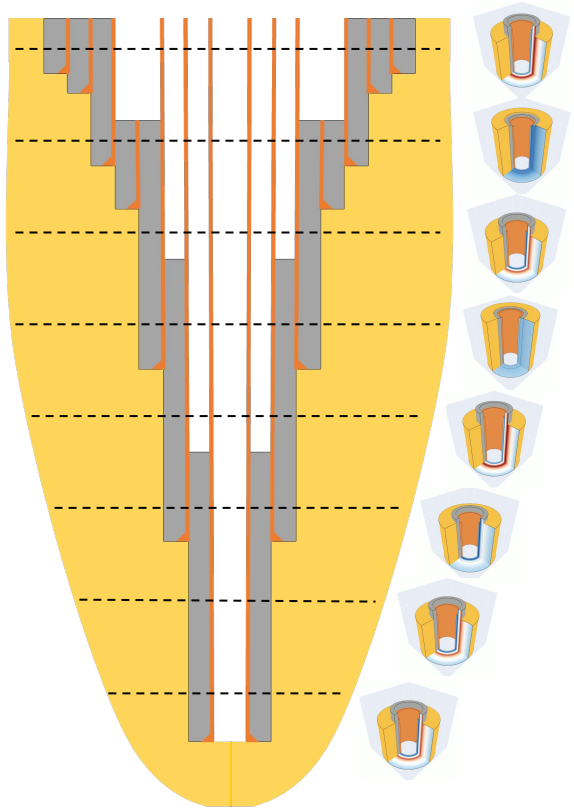
TotalEnergies



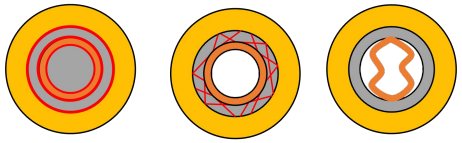
TotalEnergies' well integrity experiment (Joulin et. al 2022)

DRISCO Simulator and Failure Prediction

Simulations for each depth of interest



Different types of failure are predicted

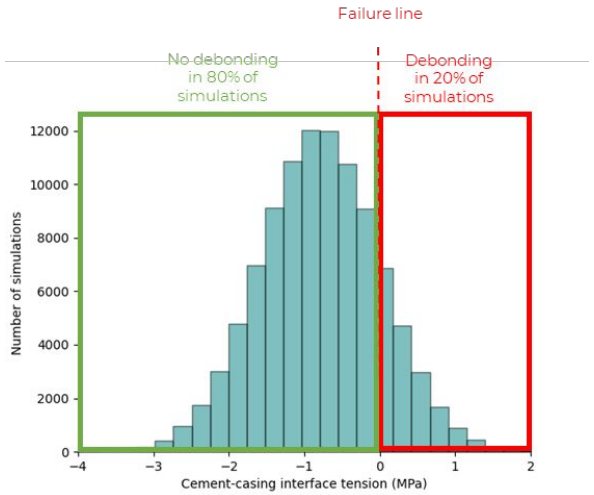


DRISCO Simulator and Managing Uncertainty

Considering thousands of scenarios

Quantity	Casing	Cement	Formation
Δ	0.005	0.017	8.000
E	200.0	16.0	28.0
ν	0.25	0.24	0.44
ρ	7.4	2.1	2.5
β	1.3	1.2	1.5
k	45.2	6.7	4.4
$c^{(V)}$	3.4	4.0	1.6
ϕ	0.00	0.34	0.07
α	0.00	0.80	0.82
λ	0.00	0.14	34.00
C	250.0	22.6	16.0
ψ	0.0	15.0	42.0

Visualizing the results and obtaining a probability of failure



Source: https://www.thinkgeoenergy.com/thermaprime-completes-drilling-program-for-pgpc-geothermal-fields-philippines/

Challenge: limited workover rigs that are costly to send to fix geothermal wells that are across a network of Islands.

Solution: DRISCO provides a predictive well integrity tool that acts as an early warning system, that allows for better planning of those workover rigs to plan remediation work.

Cost Saving: with better planning before a well has an issue, ensures geothermal wells have minimal downtime and rig utilisation is optimised, lowering total cost of ownership.