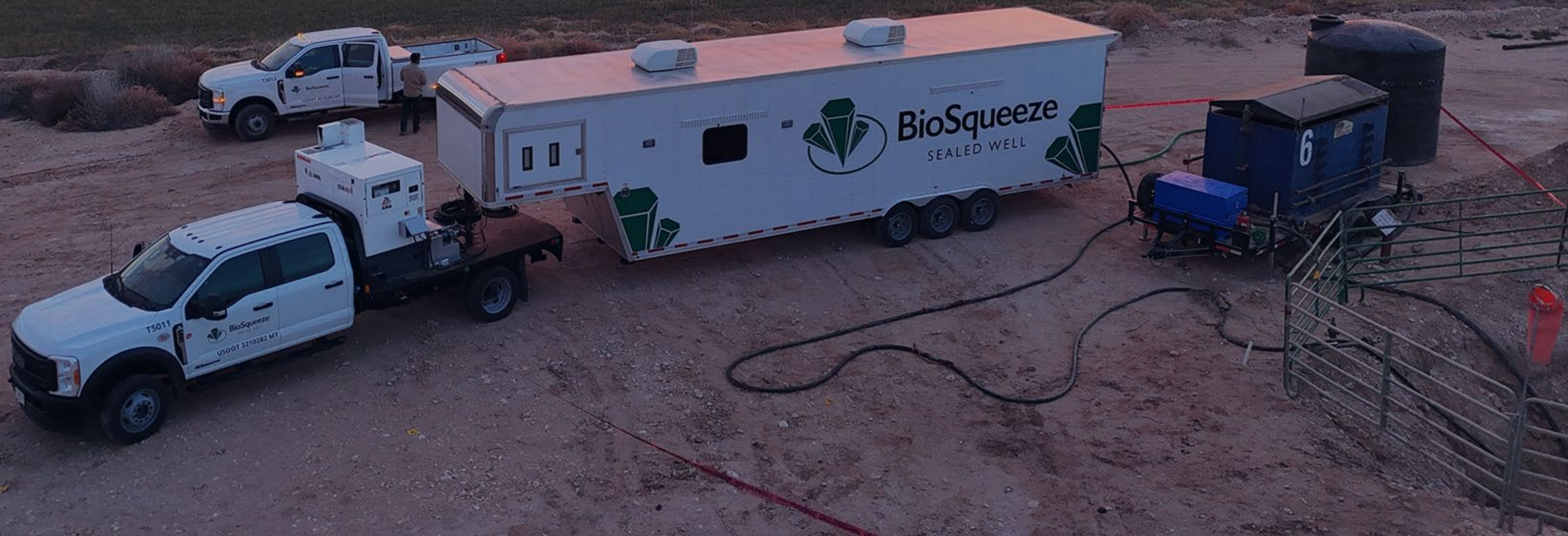




BioSqueeze
SEALED WELL

Biom mineralization

Next Generation Well Integrity Technology



Orphan Wells: A Growing Problem

141,959¹

Documented orphan wells

250,000 – 740,000¹

Undocumented orphan wells

777,357²

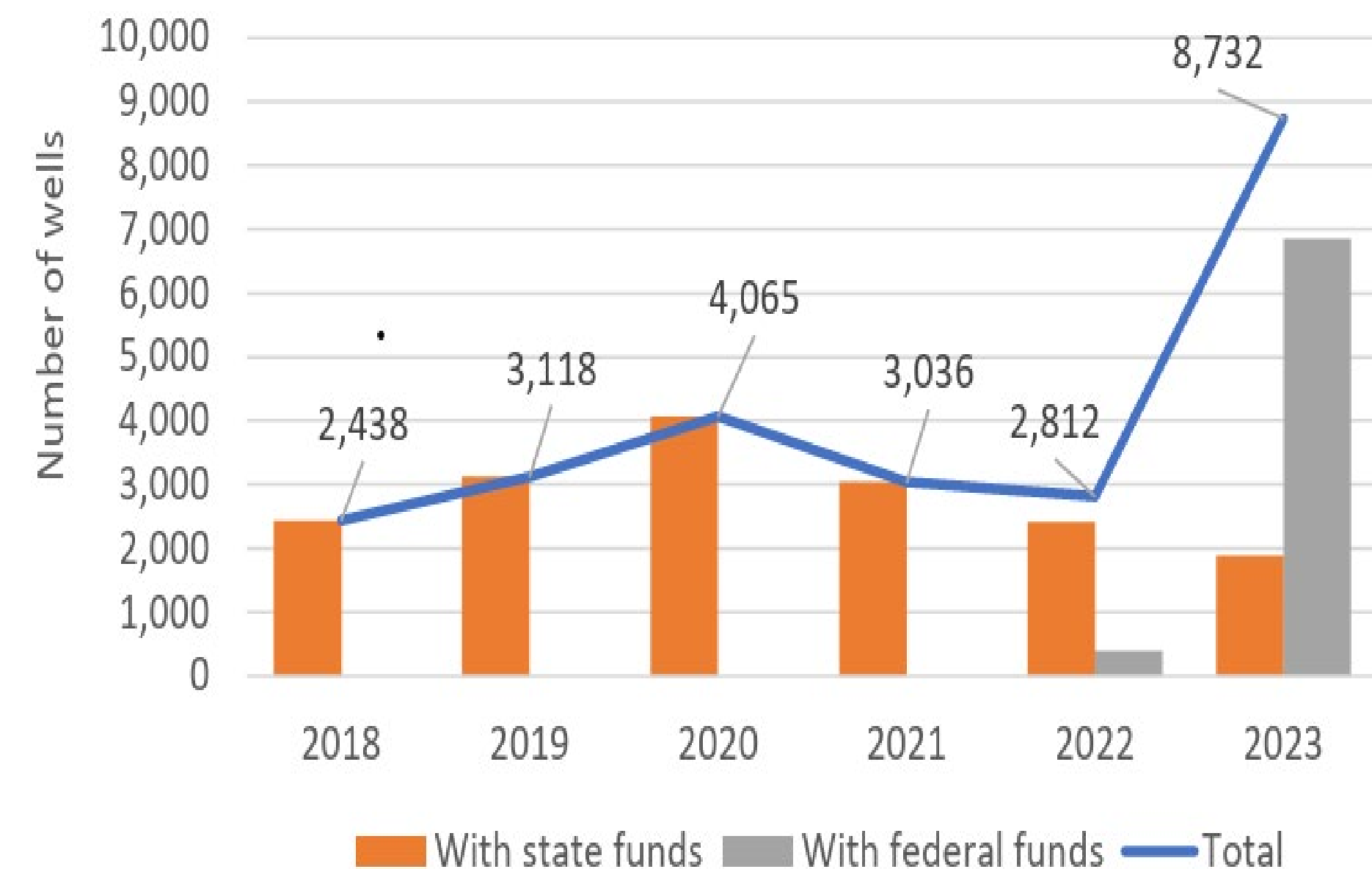
Marginal wells at risk
of becoming orphans

231,287³

Idle wells at risk of
becoming orphans

1. IOGCC. Supplemental Information on Orphan Well Plugging and Site Restoration. 2024.
2. IOGCC. Marginal Well Report. 2016.
3. IOGCC. Idle and Orphan Oil and Gas Wells: State and Provincial Regulatory Strategies. 2021.

Orphan Well Plugging



29 states reporting

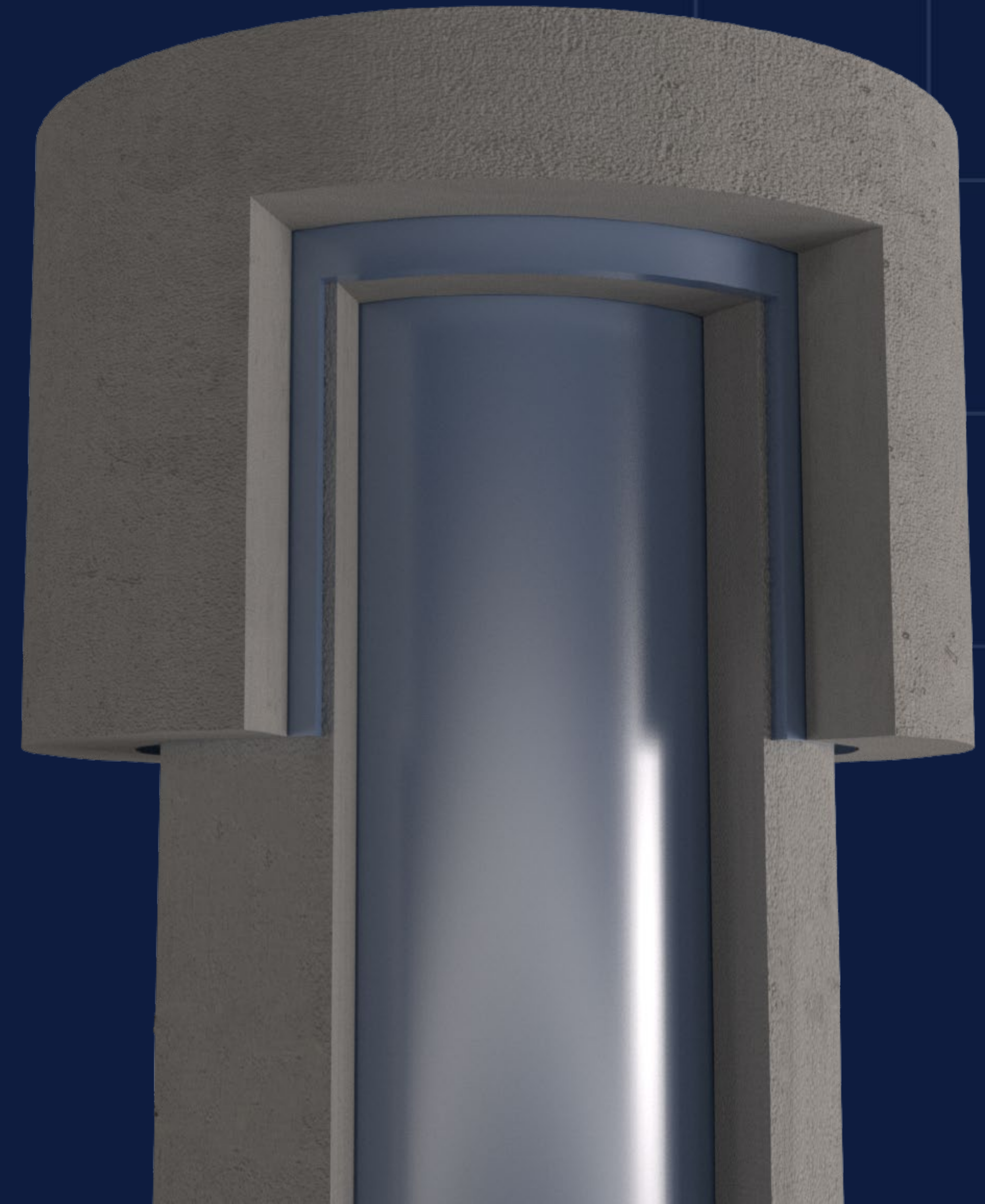
\$56B – \$76B¹

Cost to plug orphan/at risk wells

Plugging Problem: Easy vs Hard Wells

Straightforward Abandonment

- Distribution: ~85% of wells ⁴
- Process: place bridge plugs and pump cement to isolate producing zones
- Time: ~1 week
- Cost: ~\$40K/well ¹



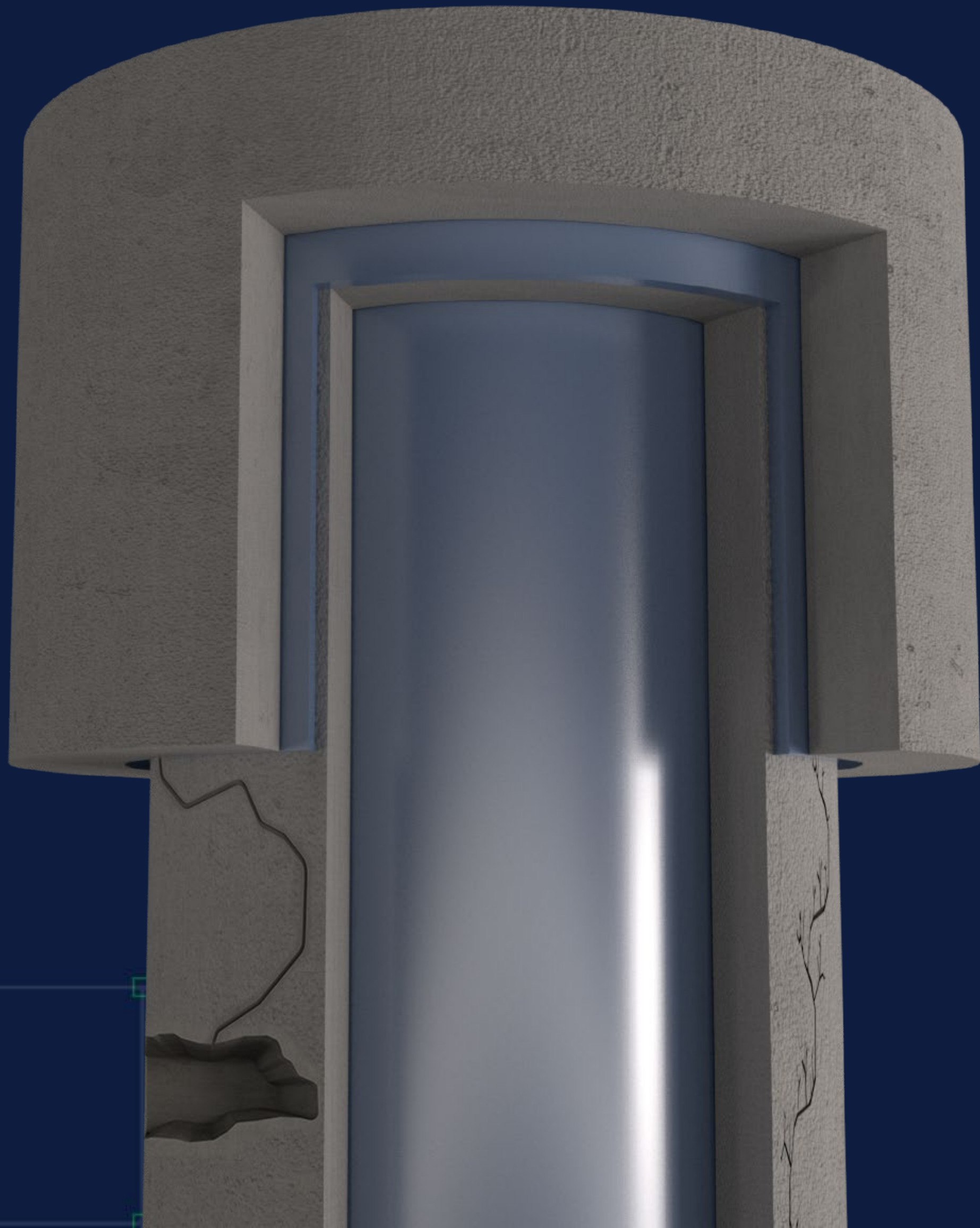
1. IOGCC. Supplemental Information on Orphan Well Plugging and Site Restoration. 2024.
4. G. Lackey, H. Rajaram, J. Bolander, O.A. Sherwood, J.N. Ryan, C.Y. Shih, G.S. Bromhal, & R.M. Dilmore, Public data from three US states provide new insights into well integrity, Proc. Natl. Acad. Sci. U.S.A. 118 (14) e2013894118, <https://doi.org/10.1073/pnas.2013894118> (2021).

Plugging Problem: Easy vs Hard Wells

Challenging Abandonment

- Distribution: ~15% of wells ⁴
- Process: run diagnostics to identify source, perf and squeeze sealant, drillout unsuccessful attempts and try again as needed
- Time: +3 months
- Cost: +\$250K/well

4. G. Lackey, H. Rajaram, J. Bolander, O.A. Sherwood, J.N. Ryan, C.Y. Shih, G.S. Bromhal, & R.M. Dilmore, Public data from three US states provide new insights into well integrity, Proc. Natl. Acad. Sci. U.S.A. 118 (14) e2013894118, <https://doi.org/10.1073/pnas.2013894118> (2021).



Well Integrity: Why Its Difficult

Zonal Isolation

Debonding, wormholes, and fractures in cement create leakage pathways that allow uncontrolled liquid and gas migration

Channels & Micro Annuli

Leakage pathways are very narrow, making them inaccessible for high viscosity sealants like cement

Ineffective Remediation

Unsuccessful attempts to mitigate the issue can add up quickly and become very costly



Biomining: Restoring Cement Bond



Low-Viscosity

1.05 cP fluids access and seal sub-micron leakage pathways



Self Diverts

Leakage pathways are sealed with active permeability reduction



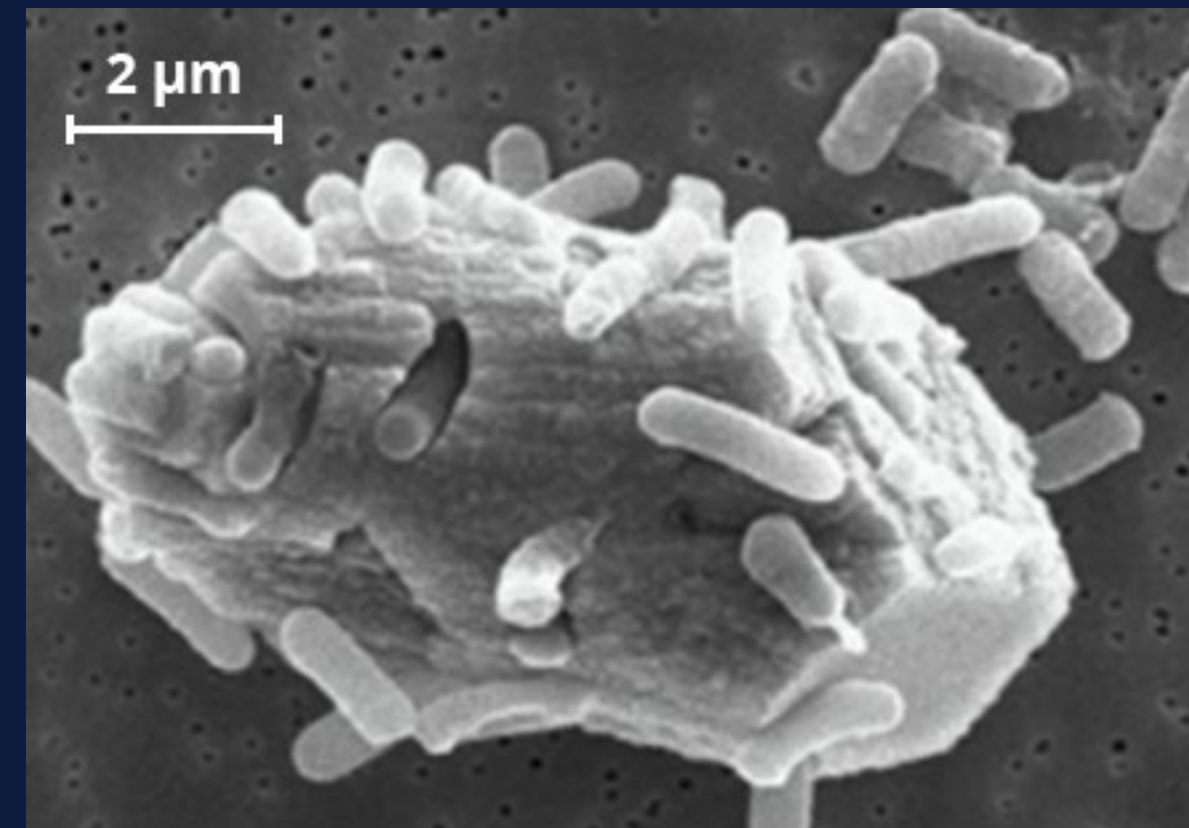
Impermeable Seal

Biofilm bonds to any material forming a permanent limestone barrier



Environmentally Friendly

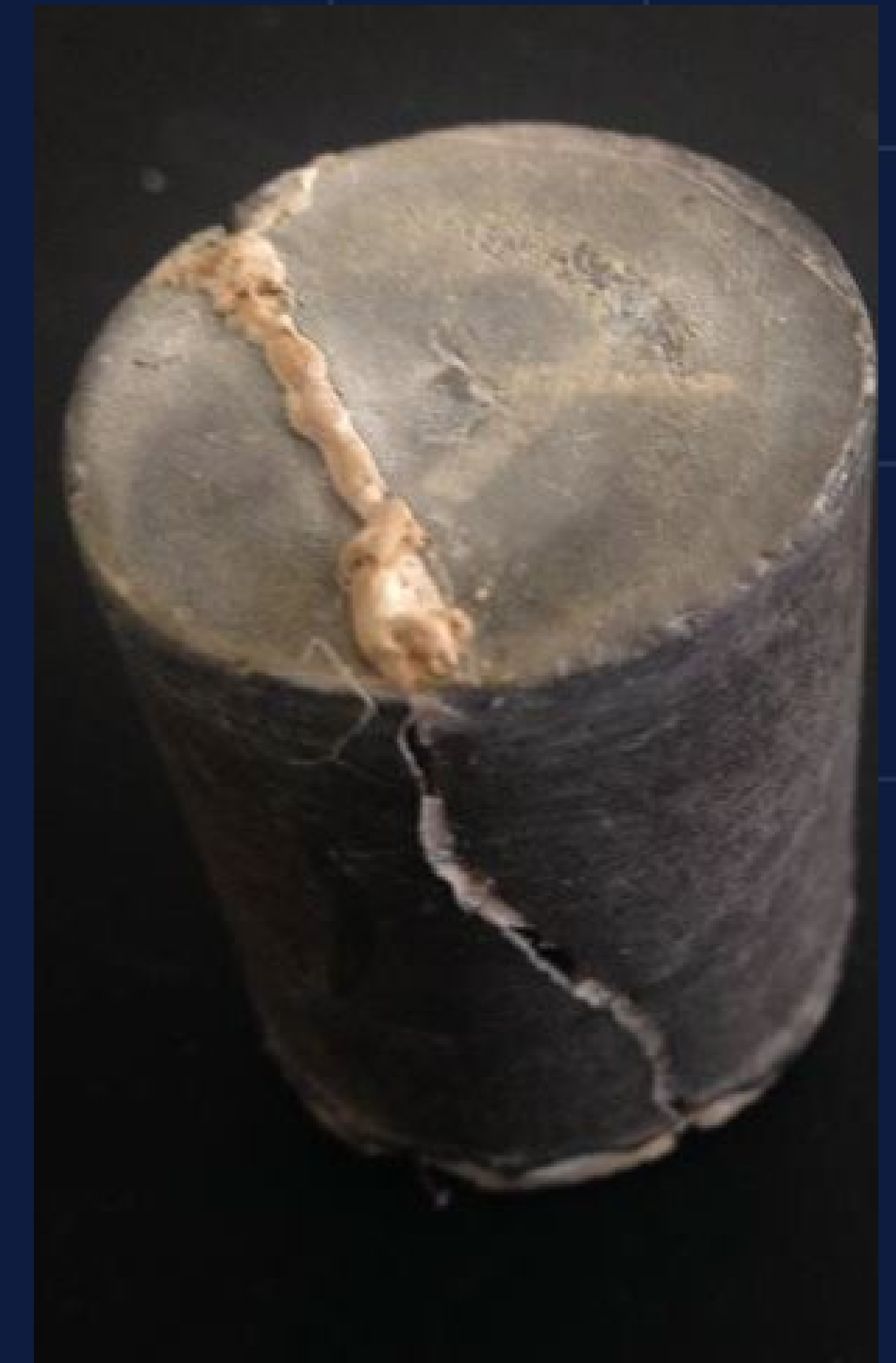
Natural soil microbes approved for treatment in sensitive areas



Microbes Forming Calcite



Calcite Crystals Bonded to Cement



Biomined Fracture

Leveraging Technology: Deeper Penetration

Extended Reach

Biomining fluids travel
+800 feet from the point of
injection

Better Bond

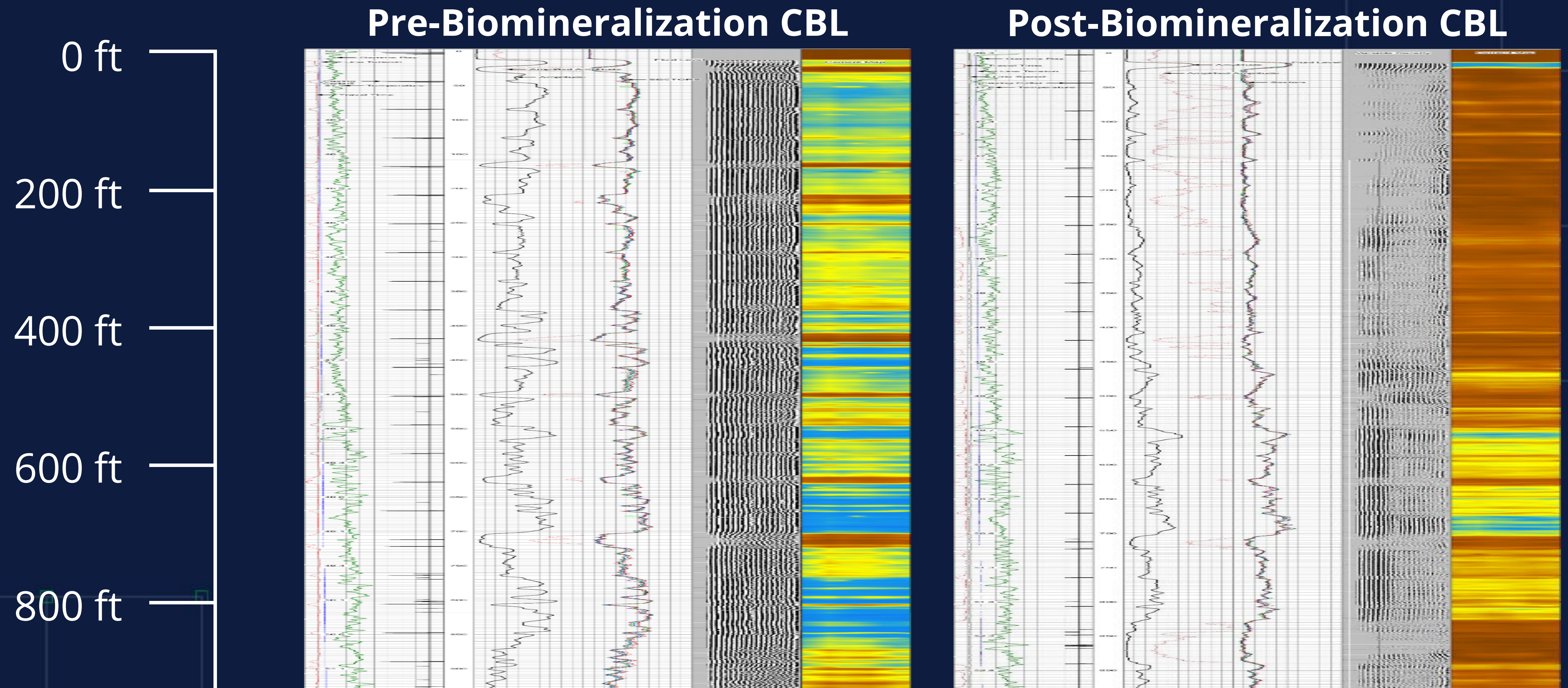
Limestone formed is gas-tight
and stronger than cement

New Methodology

Surface injection traces leakage
pathways to their source
instead of creating a cap



Cement Healed +800 ft from Surface



Logs displayed are confidential & proprietary

Case Study

Ohio Orphan Well

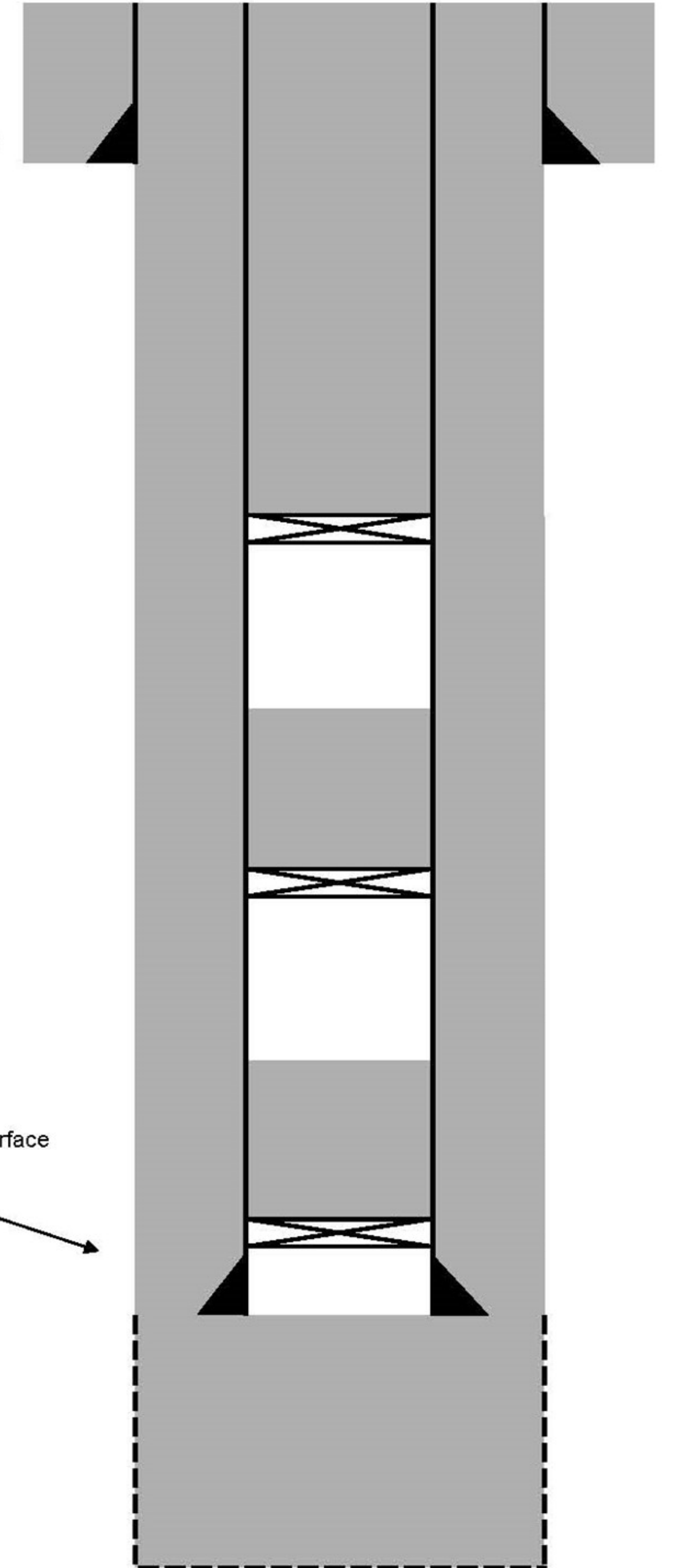
Challenge

- Early 1900s – Initial construction unrecorded
- WWII – Stripped of casing for the war effort and orphaned
- 2023 – New casing set and cemented, well plugged to surface
- 2024 – Leaking +450 bubbles/minute



13-3/8" Surface Casing
Set @ 50 ft & cemented to surface

7" Production Casing
Set @ 1,000 ft & cemented to surface



*Plugs are not to scale

Case Study

Ohio Orphan Well

Solution

- Pumped fluids riglessly from surface to heal cement
- 51 gal injected over 48 hours
- 0.145 gpm to 0.006 gpm (96% reduction)
- 0 bubbles and 0 psi after treatment
- Well cut, capped, and abandoned



Proactive Mitigation: Flipping the Script

Non-Invasive Treatment

Able to mitigate SCP from surface without a rig or perfs and leaves the wellbore full ID

Prepared to Plug

Treating well integrity issues earlier in the lifecycle when \$ is available makes plugging easy later when \$ is limited

Environmental Impact

Fixing integrity issues when they occur eliminates methane emissions for the life of the well (15-30 years) ⁶



+\$8M
Cost to
Drill ⁵



\$55K
Cost to
Ensure Integrity



\$40K
Cost to
Plug ¹

1. IOGCC. Supplemental Information on Orphan Well Plugging and Site Restoration. 2024.

5. U.S. House of Representatives. (2023). Field hearing on the impact of rising drilling costs in the oil and gas sector [Hearing transcript]. U.S. Government Publishing Office. <https://www.govinfo.gov/content/pkg/CHRG-118hhrg51875/pdf/CHRG-118hhrg51875.pdf>

6. Smith, M. (2023, January 31). *Oil and Gas Technology and Geothermal Energy – Typical operational lifetimes for wells* [CRS Report No. R47405]. Congressional Research Service. <https://crsreports.congress.gov/product/pdf/R/R47405>

Summary & Work to Date

Ineffective Alternatives

Cements and resins routinely fail to restore zonal isolation delaying plugging and piling up costs

Proven Solution

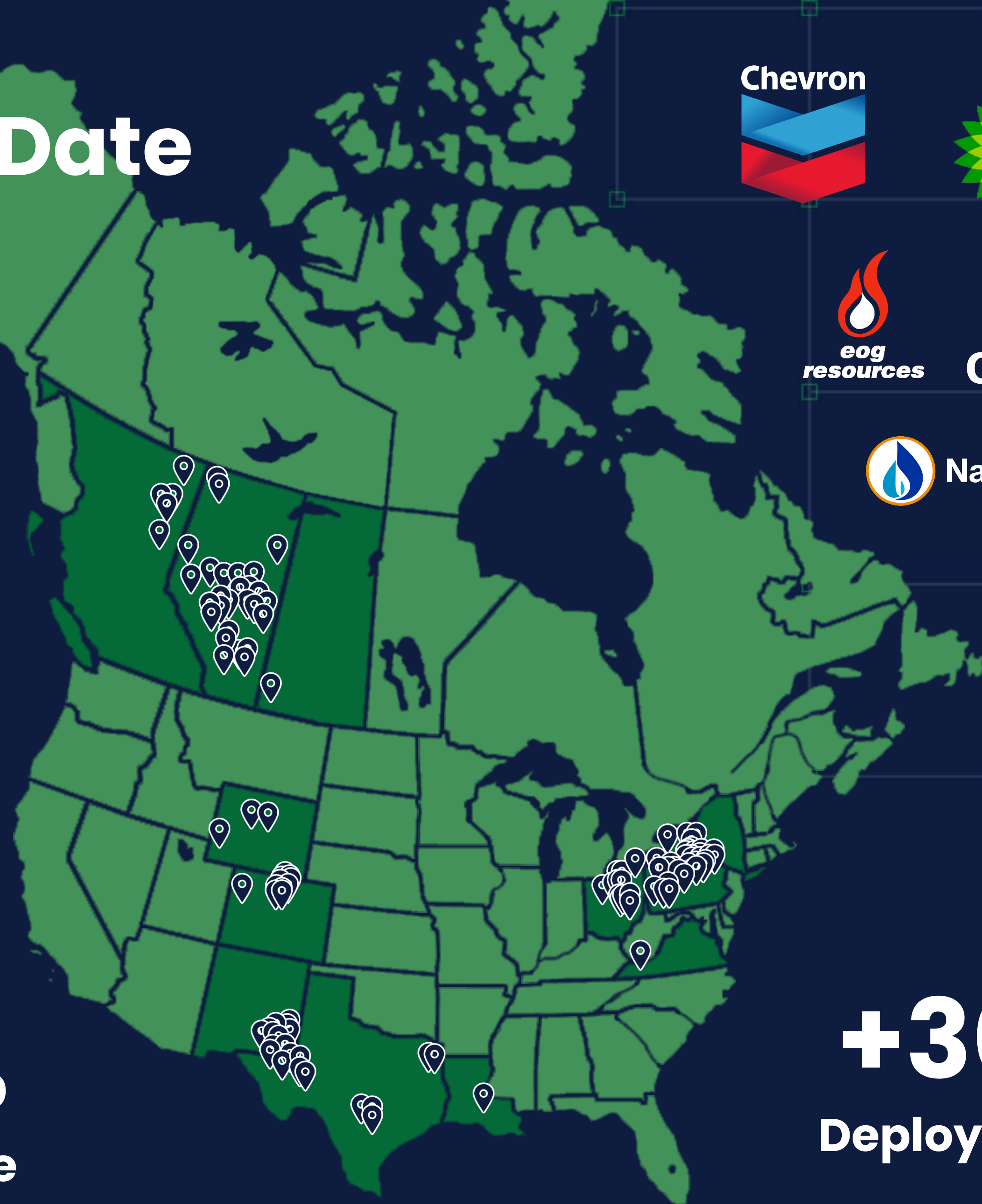
Industry leading success rate efficiently eliminates integrity issues, saving \$ wasted on repeated unsuccessful attempts

Reduced Risk

Flat rate pricing makes expenditure predictable

+92%
Success Rate

+300
Deployments





Questions?



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